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(925) 946-0455

BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SM					
1						2.9	SILTY SAND (SM): light gray, fine grained, trace clay, weak cementation, moist.
2							
3							
4							
5							
6		CL				10,000	SANDY SILTY CLAY (CL): light gray, weak cementation, moist.
7							
8						3000	SANDY SILTY CLAY (CL): as above.
9						2400	SILTY CLAY (CL): medium gray, moderate cementation, wet.

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
11							
				X		2450	
12		SC				2000	CLAYEY SAND (SC): light to medium gray, fine to coarse grained, trace silt, loose, wet.
13							
14							
15							
				X		900	CLAYEY SAND (SC): as above
16							
17							
18							
19							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SM				PID NOT WORKING	No Recovery.
1							SILTY SAND (SM): light gray, fine grained, weak cementation, moist.
2							
3							
4							
5		CL					SILTY CLAY (CL): light gray, trace sand, weak cementation, wet.
6							
7							
8							
9							SILTY CLAY (CL): medium brown with light brown banding, moderate cementation, moist.

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BOREHOLE LOG

Project Number: 4395.00
Project Name: AIOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
11		SC				PID NOT WORKING	CLAYEY SAND (SC): medium brown, fine grained, wet.
12		SM					SILTY SAND (SM): medium brown, fine grained, wet.
13							
14							
15		CL					SANDY CLAY (CL): dark brown, fine grained sand, moderate cementation, wet.
16							
17							
18							
19							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SM					No Recovery.
1							SILTY SAND (SM): light gray, fine grained, weak cementaion, moist.
2							
3							
4							
5							
6		CL					SILTY CLAY (CL): light gray, trace sand, weak cementation, wet.
							SILTY CLAY (CL): medium gray, weak cementation, wet.
7							
8							
9							SILTY CLAY (CL): medium brown with light brown banding, weak cementation, moist.

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BOREHOLE LOG

Project Number: 4395.00

Project Name: ATOFINA

Location: Portland, Oregon

Contractor: Cascade

Drilling Method: Geoprobe

Logged By: D. Betts

Date(s): 11/30/00

Total Depth: 16.00'

Borehole Dia.: 2.00in

Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
11		SC					CLAYEY SAND (SC): medium brown, fine grained, wet.
		SM					SILTY SAND (SM): light gray, fine grained, wet.
12							
13							
14							SILTY SAND (SM): medium brown, fine grained, wet.
15							
16							
17							
18							
19							

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BOREHOLE LOG

Site Id: VP-12

Project Number: 4395.00

Project Name: ATOFINA

Location: Portland, Oregon

Contractor: Cascade

Drilling Method: Geoprobe

Logged By: D. Betts

Date(s): 11/30/00

Total Depth: 16.00'

Borehole Dia.: 2.00in

Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SW					No Recovery.
1							SAND (SW): medium brown/gray, fine grained, loose, weak cementation, dry.
2							
3							
4		SM					SANDY SILT (SM): medium brown, fine grained sand, moderate cementation.
5							
6		SC					CLAYEY SAND (SC): medium brown/gray, fine grained, trace silt, weak cementation, low plasticity.
7							
8		CL					CLAY (CL): medium brown, low cementation, high plasticity, wet.
9							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
11		SC					
12							CLAYEY SAND (SC): medium gray, fine grained, low cementation, wet.
13							CLAYEY SAND (SC): as above, medium brown.
14		SW					SAND (SW): dark brown, fine grained, loose, wet.
15							
16							
17							
18							
19							

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BOREHOLE LOG

Site Id: VP-13

Project Number: 4395.00

Project Name: ATOFINA

Location: Portland, Oregon

Contractor: Cascade

Drilling Method: Geoprobe

Logged By: D. Betts

Date(s): 11/30/00

Total Depth: 16.00'

Borehole Dia.: 2.00in

Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SW					No Recovery.
1							SAND (SW): medium to dark brown, fine grained, loose, damp.
2							
3							
4							
		SM					SILTY SAND (SM): medium to light gray, fine grained, weak cementation, moist.
5							
6							
7		SC					CLAYEY SAND (SC): medium brown, fine grained, wet.
8							
9		CL					CLAY (CL): medium to dark brown, high plasticity, wet.

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filler Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
11							SANDY CLAY (CL): medium brown, trace silt, medium to high plasticity, wet.
12		SC					CLAYEY SAND (SC): medium gray, fine grained, low plasticity, wet.
13							
14							
15							CLAYEY SILTY SAND (SC): medium gray/brown, fine grained, low plasticity, wet.
16							
17							
18							
19							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SW					
1						2.5	SAND (SW): medium brown, medium to fine grained, trace silt, loose, damp.
2							
		SM				3.0	SILTY SAND (SM): medium brown, fine grained, weak cementation, damp.
3							
4							
5							
6		SC				250	CLAYEY SAND (SC): medium to dark brown, fine grained, weak cementation, moderate plasticity, damp.
7							
						303	SILTY SAND (SC): medium to dark brown, fine grained, weak cementation, wet.
8							
9							CLAYEY SAND (SC): medium brown, low to moderate plasticity, wet.

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		CL				6400	CLAY (CL): dark brown, moderate to high plasticity, wet.
11							
12							
13							
14							
15		SM				403	SILTY SAND (SM): medium gray, fine grained, weak cementation, damp.
16							
17							
18							
19							

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BOREHOLE LOG

Site Id: VP-15

Project Number: 4395.00

Project Name: ATOFINA

Location: Portland, Oregon

Contractor: Cascade

Drilling Method: Geoprobe

Logged By: D. Betts

Date(s): 11/30/00

Total Depth: 16.00'

Borehole Dia.: 2.00in

Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SW					SAND (SW): dark brown/gray, medium to fine grained, loose, moist.
1							
2							
		SC				455	SILTY CLAYEY SAND (SC): medium gray, fine grained, low plasticity, moist.
3							
4		SM				3100	SILTY SAND (SM): medium brown, fine grained, moist.
5							
6		SC				3500	CLAYEY SAND (SC): medium brown, fine grained, low to moderate plasticity, wet.
7							
8		SM					SILTY SAND (SM): medium gray, fine grained, trace clay, no plasticity, moist.
9							
		CL				6400	CLAY (CL): medium gray, trace silt, high plasticity, wet.

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BOREHOLE LOG

Project Number: 4395.00
Project Name: AIOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 11/30/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
11							
12		SC				200	CLAY (CL): as above CLAYEY SAND (SC): medium to dark gray, fine grained, trace silt, moderate plasticity, soft, wet.
13							
14		SM				205	SILTY SAND (SM): medium to dark gray, fine grained, weak cementation, no plasticity, moist.
15							
16							
17							
18							
19							

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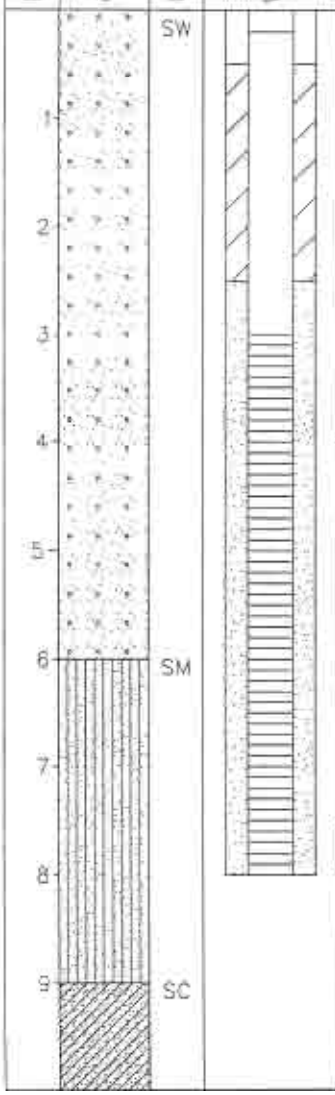
BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'



Depth (ft)	USCS Code	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
	SW				
1					SAND (SW): medium brown, fine to medium grained, loose, dry.
				4.0	SAND (SW): medium gray, fine to medium grained, loose, dry.
2					
3					SAND (SW): medium gold-brown, fine grained, loose, moist.
4					
5					
6	SM			48.0	SILTY SAND (SM): medium brown, fine grained, loose, dry.
7					
				2000	SILTY SAND (SM): as above.
8					
9	SC			>9999	CLAYEY SAND (SC): medium brown, fine grained, soft, wet.

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		CL				>9999	CLAY (CL): medium brown, soft, high plasticity, wet.
11							
12							
13						1260	SANDY CLAY (CL): medium brown, fine grained sand, high plasticity, wet.
14							SILTY CLAY (CL): dark brown, trace fine sand (13.5'), dry.
15							
16		SC				300	SILTY CLAYEY SAND (SC): dark brown, fine grained, low plasticity, moist.
17							
18							
19							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SW					SAND (SW): dark brown, medium to fine grained, loose, dry.
1							
2							
3							SILTY SAND (SM): medium brown/gray, fine grained, loose, dry.
4							
5							
6		SC					CLAYEY SAND (SC): medium brown, fine grained, low plasticity, moist.
		CL					SANDY CLAY (CL): fine grained sand, high plasticity, moist to wet.
7							
8		GP					GRAVEL (GP): dark brown/gray, with fine grained sand, loose, dry.
9		SC					CLAYEY SAND (SC): medium brown, fine grained, low plasticity, wet.
		CL					SANDY CLAY (CL): medium brown, fine grained sand, high plasticity, wet.

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BOREHOLE LOG

Project Number: 4395.00

Project Name: ATOFINA

Location: Portland, Oregon

Contractor: Cascade

Drilling Method: Geoprobe

Logged By: D. Betts

Date(s): 12/01/00

Total Depth: 16.00'

Borehole Dia.: 2.00in

Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
							CLAY (CL): medium gray/brown, trace silt and fine grained sand, moderate to high plasticity, wet.
11							
12							
13							
		SM					SILTY SAND (SM): medium gray/brown, fine grained, weak cementation, dry to moist.
14							
15							
16							
17							
18							
19							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SW					
1							SAND (SW): dark brown, medium to fine grained, loose, dry to moist.
2							
3							
							SAND (SW): light gray, fine grained, loose, dry to moist.
4							SAND (SW): as above, light brown.
5		SM					SILTY SAND (SM): light brown, fine grained, loose, dry.
6							
7							
		SC					CLAYEY SILTY SAND (SC): light brown, fine grained, dry.
8							
9							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
11							CLAYEY SAND (SC): light gray, with gravel, fine grained, loose, moist. CLAYEY SILTY SAND (SC): light brown/gray, fine grained, low to moderate plasticity, moist.
12		CL					SILTY CLAY (CL): dark brown, moderate to high plasticity, moist.
13		SM					SILTY SAND (SM): medium to dark gray, fine grained, loose, moist.
14		SC					CLAYEY SAND (SC): medium gray, fine grained, low plasticity, moist.
15							CLAYEY SAND (SC): dark brown, fine grained, low plasticity, dry to moist.
16							
17							
18							
19							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
1		SW					SAND (SW): medium to dark brown, medium to fine grained, loose, dry.
2							
3							SAND (SW): light brown, fine grained, loose, dry to moist.
4							
5							
6							
7							
8							
9							

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC	dia: 0.75in	fm: 0.2'	to: 3.00'	
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SC					CLAYEY SAND (SC): medium brown, fine grained, trace silt lenses, moderate plasticity, moist.
11		CL					SANDY CLAY (CL): medium brown, fine grained sand, high plasticity, wet.
12		SC					CLAYEY SILTY SAND (SC): medium brown, fine grained, moist.
13		CL					CLAY (CL): medium brown, high plasticity, wet.
14		SC					CLAYEY SAND (SC): medium brown/gray, fine grained, trace silt, low plasticity, moist.
15							
16							
17							
18							
19							

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BOREHOLE LOG

Site Id: VP-20

Project Number: 4395.00

Project Name: ATOFINA

Location: Portland, Oregon

Contractor: Cascade

Drilling Method: Geoprobe

Logged By: D. Betts

Date(s): 12/01/00

Total Depth: 16.00'

Borehole Dia.: 2.00in

Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		SW					
1							SAND (SW): medium to dark brown, medium to fine grained, loose, dry.
2							
3							SAND (SW): light brown/gray, fine grained, loose, dry to moist.
4							
5							
6		SC					CLAYEY SAND (SC): medium brown, fine grained, low plasticity, dry.
7		SM					SILTY SAND (SM): medium brown, fine grained, loose, moist.
8		CL					SANDY CLAY (CL): medium brown/gray, fine grained sand, moderate plasticity, wet.
9		SM					SILTY SAND (SM): medium brown, fine grained, loose, moist.

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BOREHOLE LOG

Project Number: 4395.00
Project Name: ATOFINA
Location: Portland, Oregon
Contractor: Cascade
Drilling Method: Geoprobe
Logged By: D. Betts
Date(s): 12/01/00

Total Depth: 16.00'
Borehole Dia.: 2.00in
Initial Water Level:

Probe Construction Details

Blank Casing: type: Sch 40 PVC		dia: 0.75in	fm: 0.2'	to: 3.00'
Screens: type: Slotted	size: 0.020in	dia: 0.75in	fm: 3.00'	to: 8.00'
Annular Fill: type: Grout (Bentonite Cement)			fm: 0.50'	to: 2.50'
type: 10/20 Sand Filter Pack			fm: 2.50'	to: 8.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Sample Number	PID (ppm)	Soil Description/Classification
		CL					SANDY CLAY (CL): medium brown, fine grained sand, low plasticity, wet.
							CLAY (CL): medium gray, trace fine grained sand and silt, moderate plasticity, wet.
11							CLAY (CL): as above, moist.
12							
		SM					SILTY SAND (SM): medium gray, fine grained, trace clay, moist.
13		CL					CLAY (CL): medium gray, low plasticity, dry to moist.
14		SC					CLAYEY SAND (SC): medium brown, fine grained, low plasticity, wet.
		CL					SILTY SANDY CLAY (CL): dark brown, low plasticity, moist.
15		SC					CLAYEY SILTY SAND (SC): dark brown, fine grained, dry to moist.
16							
17							
18							
19							

Project No: 8601192.002.0501

Project: Acid Plant IRM

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

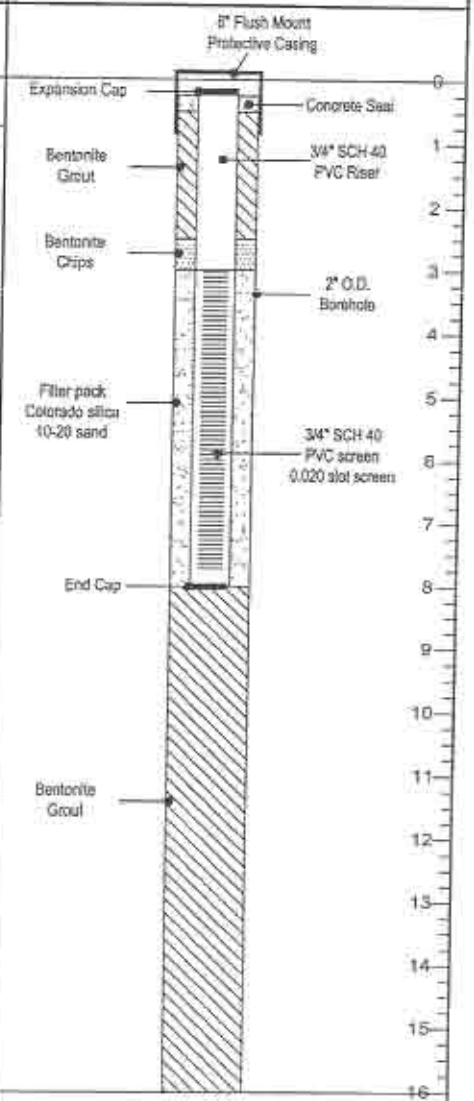
Vapor Extraction Well: VP-21

Ground surface: Level concrete

Geologist: D. Lamadrid, L. McWilliams

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GM	ASPHALT (0-3" BGS).
							Gravel subbase (3-7" BGS).
1						SM	Slightly silty fine SAND, light gray (2.5Y 7/1) silt <10%, moist.
2							
3	SO1528		50%				
4							Increased silt to 40-50% @ 3.5' BGS.
5							
6			50%				
7	SO1529					ML	SILT, brown (10YR 5/3), trace very fine sand, moist to wet.
	SO1531						
8	SO1532*						
9	SO1530						As above, increased moisture, some clay, slight odor.
10			75%				
11	SO1533						
12	SO1534					SM	Silty very fine SAND, light yellow (2.5Y 6/4), silt 30-40%, more dense than above, some faint laminae, slight odor, moist to wet.
13	SO1535						
14			75%				Color change to dark olive-brown (2.5Y 3/3), wet.
15	SO1536						
	SO1537						
16							Total depth @ 16' BGS.
17							* Duplicate sample for interval specified
18							
19							
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Geo-Tech Explorations

Drill Method: Geoprobe

Drill Date: 17 December 2001

Well Casing Elevation: 34.46'

Well Cover Elevation: 34.68'

Borehole Diameter: 2.0" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 1

Project No: 8601192.002.0501

Project: Acid Plant IRM

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

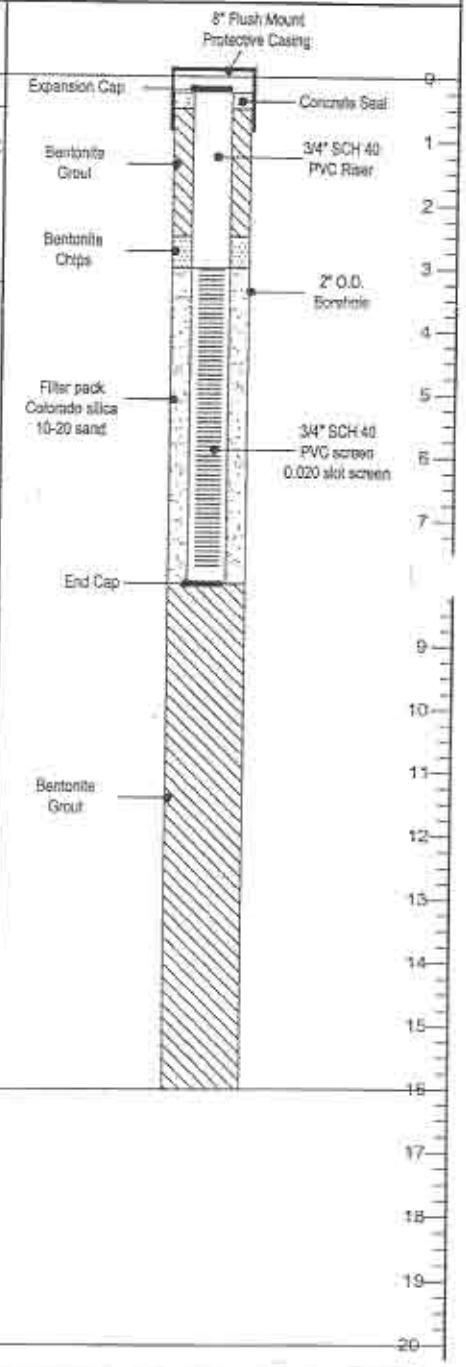
Vapor Extraction Well: VP-22

Ground surface: Level concrete

Geologist: D. Lamadrid, L. McWilliams

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0							CONCRETE (0-6" BGS).
1						SW	Fine to medium SAND, trace fines, dark yellow-brown (10YR 4/6) damp to moist, faint odor.
2							
3	SO1518		50%				
4						SM	Silty, very fine SAND, light yellow-brown (10YR 5/4) moist, faint odor.
5	SO1519						
6			50%			ML	Grading to silt, wet, trace sand.
7	SO1520					SM	Silty, very fine SAND, light yellow-brown (10YR 5/4) moist to wet, orange-brown mottling near contact, slight odor.
8	SO1521					ML	Grading to SILT, wet, trace sand.
9	SO1522						
10			75%				
11	SO1523					ML/ SM	Grading to silty, very fine SAND, sandy SILT, yellow-brown (10YR 5/4), wet, faint odor.
12	SO1524						
13	SO1525						
14			75%				Color change to dark olive-brown (2.5Y 3/3), wet.
15	SO1526					ML	Grading to SILT, wet, trace sand.
16	SO1527					ML	Clayey SILT dark brown (7.5YR 3/3), moist. Silty fine sand, trace silt at very bottom of sample.
17							Total depth @ 16' BGS.
18							
19							
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Geo-Tech Explorations

Drill Method: Geoprobe

Drill Date: 18 December 2001

Well Casing Elevation: 34.46'

Well Cover Elevation: 34.81'

Borehole Diameter: 2.0" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 1

Project No: 8601192.002.0501

Project: Acid Plant IRM

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

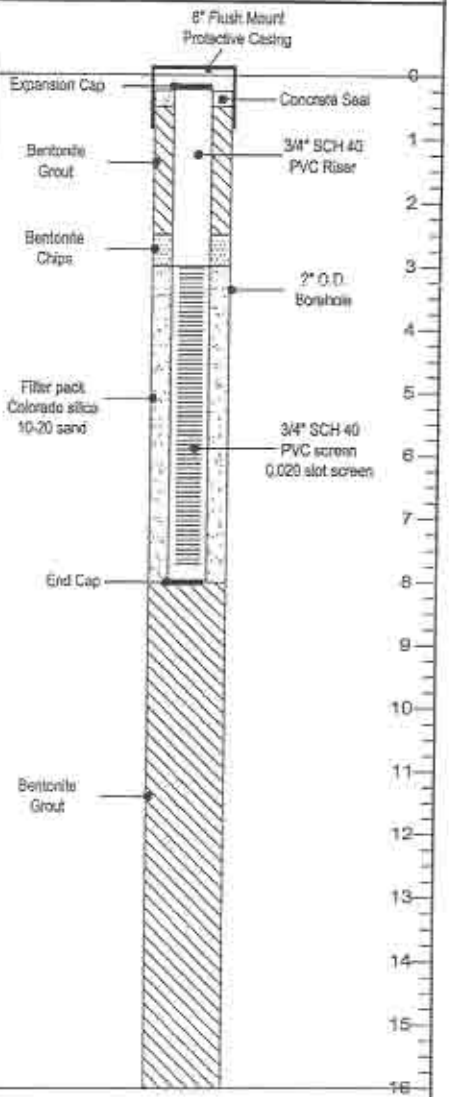
Vapor Extraction Well: VP-23

Ground surface: Level concrete

Geologist: D. Lamadrid, L. McWilliams

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0							CONCRETE (0-6" BGS).
1						SW	Fine to medium SAND, trace fines, dark yellow-brown (10YR 4/6) damp to moist, 1" silt lens, faint odor.
2							
3	SO1508		50%				
4						SM	Silty, very fine SAND, light yellow-brown (10YR 5/4), silt 20-30%, moist, odor.
5	SO1509						
6			85%				
7	SO1510						
8	SO1511					ML	Very fine sandy SILT, light yellow-brown (10YR 5/4), wet, slightly micaceous, strong odor.
9	SO1512						
10			85%				
11	SO1513					SM	Silty, very fine SAND, light yellow-brown (10YR 5/4), silt 20-30%, moist to wet, slightly micaceous, slight odor.
12	SO1514						
13	SO1515						
14			100%				Grading to silty very fine to fine sand.
15	SO1516						
16	SO1517						Total depth @ 16' BGS.
17							
18							
19							
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Geo-Tech Explorations

Drill Method: Geoprobe

Drill Date: 17 December 2001

Well Casing Elevation: 34.50'

Well Cover Elevation: 34.77'

Borehole Diameter: 2.0" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 1

Project No: 8601192.002.0501

Project: Acid Plant IRM

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

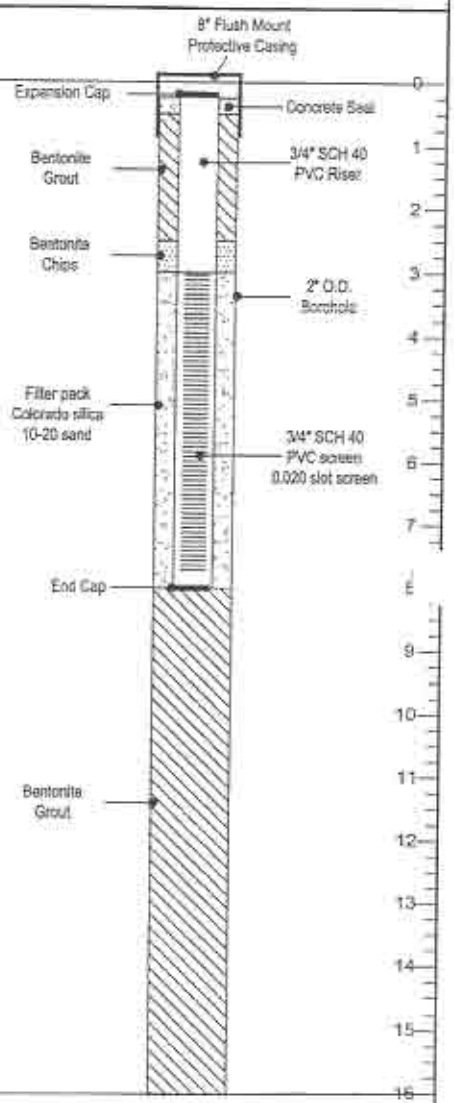
Vapor Extraction Well: VP-24

Ground surface: Level concrete

Geologist: D. Lamadrid, L. McWilliams

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0							CONCRETE (0-6" BGS).
1						SM	Slightly silty, fine to medium SAND, dark yellow-brown (10YR 3/6), silt 5-15% damp to moist.
2							
3	SO1498		50%				
4							Silty, very fine SAND, yellow-brown (10YR 5/4), silt ~20-30%, moist.
5	SO1499						
6			75%			ML	SILT, yellow-brown (10YR 5/4), wet.
7	SO1500					ML/SM	Silty, very fine SAND/sandy SILT, yellow-brown (10YR 5/4), wet.
8	SO1501						
9	SO1502						
10			100%			ML	SILT, yellow-brown (10YR 5/4), wet.
11	SO1503					ML/SM	Silty, very fine SAND/sandy SILT, yellow-brown (10YR 5/4), wet. Some orange-brown mottling, moist to wet @ 12' BGS.
12	SO1504						
13	SO1505						
14			100%				Some orange-brown laminations @ 14' BGS.
15	SO1506						
16	SO1507						Total depth @ 16' BGS.
17							
18							
19							
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Geo-Tech Explorations

Drill Method: Geoprobe

Drill Date: 17 December 2001

Well Casing Elevation: 34.44'

Well Cover Elevation: 34.55'

Borehole Diameter: 2.0" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 1

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/17/03
Initial Water Level: 30.00'

Total Depth: 36.50'
Completed Depth: 35.70'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 33.70'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 33.70' to: 35.70'

Annular Fill:
type: Grout fm: 0.00' to: 28.20'
type: Bentonite fm: 28.20' to: 31.60'
type: #10-20 Sand Filter fm: 31.60' to: 36.50'

Remark: Centralizer at 28.0'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10						
15		SP			73	SAND (SP): brown, medium dense, moist.
20					87	SAND (SP): as above, light brownish gray.
		SM				

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/17/03
Initial Water Level: 30.00'

Total Depth: 36.50'
Completed Depth: 35.70'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 33.70'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 33.70' to: 35.70'

Annular Fill:
type: Grout fm: 0.00' to: 28.20'
type: Bentonite fm: 28.20' to: 31.60'
type: #10-20 Sand Filter fm: 31.60' to: 36.50'

Remark: Centralizer at 28.0'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
					73	SILTY SAND (SM): pale yellow, medium grained, dense, moist.
30		▽			100	SILTY SAND (SM): gray, fine grained, wet.
					100	SILTY SAND (SM): as above, pale yellow (NAPL).
		ML				SILT (ML): brown, soft, moist.
35		SM				SILTY SAND (SM): pale yellow, medium dense, wet (NAPL).
		ML				SILT (ML): dark olive brown, firm, moist. Total Depth – 36.5' bgs
40						
45						

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BOREHOLE LOG

Site Id: AS-2

Project Number: 5477.60

Project Name: Atofina Chemicals

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Hollow Stem Auger

Logged By: Tim Browning

Date(s): 09/17/03

Initial Water Level: NA

Total Depth: 36.50'

Completed Depth: 36.10'

Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 34.10'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 34.10' to: 36.10'

Annular Fill:
type: Grout fm: 0.00' to: 29.00'
type: Bentonite fm: 29.00' to: 32.10'
type: #10-20 Sand Filter fm: 32.10' to: 36.50'

Remark: Centralizer at 28.0'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10						
15		SP			67	SAND (SP): brown, fine to medium grained, medium dense, moist.
20					67	SAND (SP): as above, dark gray.

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/17/03
Initial Water Level: NA

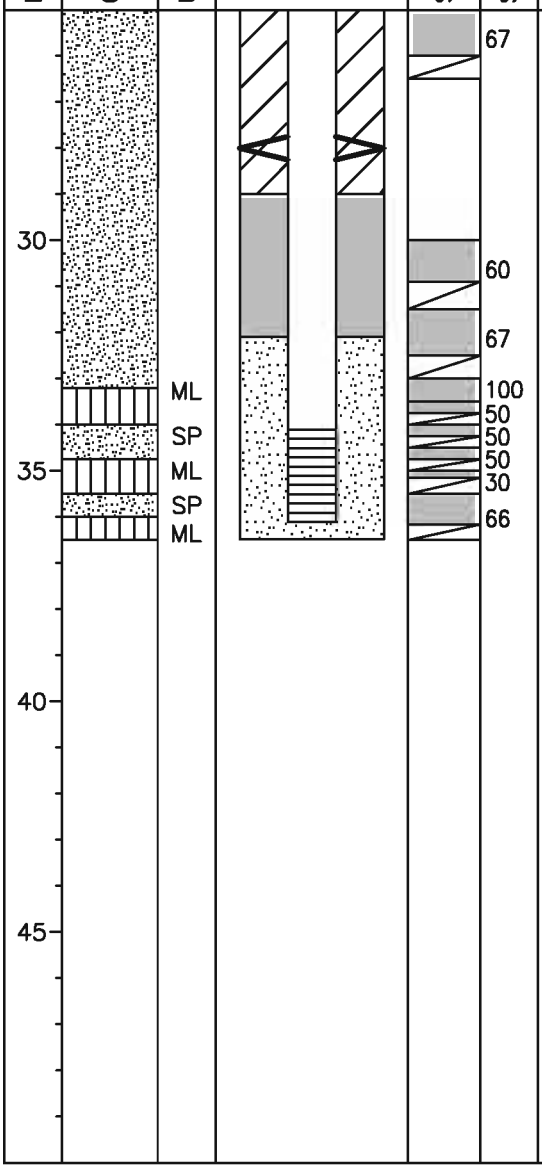
Total Depth: 36.50'
Completed Depth: 36.10'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 34.10'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 34.10' to: 36.10'

Annular Fill:
type: Grout fm: 0.00' to: 29.00'
type: Bentonite fm: 29.00' to: 32.10'
type: #10-20 Sand Filter fm: 32.10' to: 36.50'

Remark: Centralizer at 28.0'.



Sample Recovery (%)	Description/Soil Classification
67	SAND (SP): as above, pinkish gray.
60	SAND (SP): as above, brown with fibrous organics.
67	NAPL at 33.0'
100	SILT (ML): yellow, firm, moist.
50	
50	SAND (SP): yellow to olive, loose, moist (NAPL).
50	SILT (ML): dark gray, soft, moist to wet.
30	SAND (SP): dark gray, loose, wet (NAPL).
66	SILT (ML): olive gray, firm, moist.
	Total Depth - 36.5' bgs.

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/22/03
Initial Water Level: NA

Total Depth: 35.00'
Completed Depth: 34.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 24.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 24.00' to: 34.00'

Annular Fill:
type: Grout fm: 0.00' to: 19.50'
type: Bentonite fm: 19.50' to: 22.50'
type: #10-20 Sand Filter fm: 22.50' to: 35.00'

Remark: Centralizers at 13.0' and 33.0'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10						
15						
20		SP			72	SAND (SP): gray, fine to medium grained, loose, damp to moist.

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/22/03
Initial Water Level: NA

Total Depth: 35.00'
Completed Depth: 34.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 24.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 24.00' to: 34.00'

Annular Fill:
type: Grout fm: 0.00' to: 19.50'
type: Bentonite fm: 19.50' to: 22.50'
type: #10-20 Sand Filter fm: 22.50' to: 35.00'

Remark: Centralizers at 13.0' and 33.0'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
					68	SAND (SP): as above, pinkish gray.
					78	SAND (SP): as above, fine to coarse grained, moist to wet.
					68	
30					89	NAPL stringers at 30.0'.
		ML			94	SILT (ML): gray, moist.
		SM			68	SILTY SAND (SM): yellow, with gray silt laminations, medium dense, wet.
						SILTY SAND (SM): yellow, fine grained, medium dense, wet (NAPL).
35		ML				SILT (ML): gray, firm, moist.
						Total Depth – 35.0' bgs.
40						
45						

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/22/03
Initial Water Level: 32.00'

Total Depth: 35.00'
Completed Depth: 33.80'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 23.80'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 23.80' to: 33.80'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite fm: 18.00' to: 21.00'
type: #10-20 Sand Filter fm: 21.00' to: 35.00'

Remark: Centralizer at 33.0'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10						
15		SP			78	SAND (SP): dark brown, fine to medium grained, loose, moist.
20					72	SAND (SP): as above, gray.
					78	SAND (SP): as above, medium dense to dense.
					83	
					39	

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/22/03
Initial Water Level: 32.00'

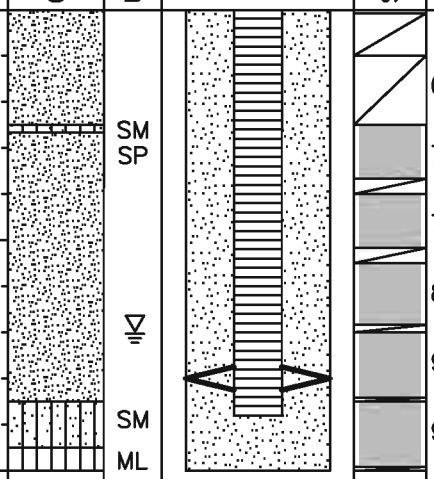
Total Depth: 35.00'
Completed Depth: 33.80'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 23.80'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 23.80' to: 33.80'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite fm: 18.00' to: 21.00'
type: #10-20 Sand Filter fm: 21.00' to: 35.00'

Remark: Centralizer at 33.0'.



Depth (ft)	USCS Code	Sample Recovery (%)	Description/Soil Classification
			SAND (SP): dark brown, moist to wet.
		0	
	SM		SILTY SAND (SM): gray, moist to wet.
	SP	78	
		78	
30			
		89	
	▽		Wet at 32.0'.
		94	
	SM		SILTY SAND (SM): yellow to gray, soft to firm, moist to wet (NAPL).
		94	
35	ML		SILT (ML): olive brown, moist.
			Total Depth – 35.0' bgs
40			
45			

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/18/03
Initial Water Level: 26.00'

Total Depth: 35.00'
Completed Depth: 35.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 25.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 25.00' to: 35.00'

Annular Fill:
type: Grout fm: 0.00' to: 20.60'
type: Bentonite fm: 20.60' to: 22.80'
type: #10-20 Sand Filter fm: 22.80' to: 35.00'

Remark: Centralizer at 34.5'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10						
15		SP			60	SAND (SP): dark brown, fine to medium grained, loose, damp to moist.
20					7	
		SM				SILTY SAND (SM): yellow, fine to medium grained, medium dense, moist.

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BOREHOLE LOG

Project Number: 5477.60

Project Name: Atofina Chemicals

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Hollow Stem Auger

Logged By: Tim Browning

Date(s): 09/18/03

Initial Water Level: 26.00'

Total Depth: 35.00'

Completed Depth: 35.00'

Borehole Dia.: 10.00in

Blank Casing:
type: Stainless Steel Blank dia: 2.00in fm: 0.0' to: 25.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 25.00' to: 35.00'

Annular Fill:
type: Grout fm: 0.00' to: 20.60'
type: Bentonite fm: 20.60' to: 22.80'
type: #10-20 Sand Filter fm: 22.80' to: 35.00'

Remark: Centralizer at 34.5'.

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
		▽			60	Becomes wet at 26.0'.
					60	
		SP			80	SAND (SP): gray, medium dense, wet.
30		SM			100	SAND (SP): as above, yellow gray. SILTY SAND (SM): yellow with gray laminations, medium grained, medium dense, wet.
					47	
					80	NAPL at 33.0'.
		ML SM			100	SILT (ML): brown, moist. SILTY SAND (SM): yellow, medium grained, medium dense, wet.
35						Total Depth – 35.0' bgs
40						
45						

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BOREHOLE LOG

Site Id: SVE-1

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/18/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 17.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 4.00in fm: 0.0' to: 12.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 4.00in fm: 12.00' to: 17.00'

Annular Fill:
type: Grout fm: 0.00' to: 7.10'
type: Bentonite fm: 7.10' to: 10.10'
type: #10-20 Sand Filter fm: 10.10' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SP			0	
15					67 87	SAND (SP): dark to very dark brown, fine to medium grained, loose, damp to moist. Total Depth – 17.0' bgs.
20						

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Hollow Stem Auger
Logged By: Tim Browning
Date(s): 09/18/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 17.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 4.00in fm: 0.0' to: 12.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 4.00in fm: 12.00' to: 17.00'

Annular Fill:
type: Grout fm: 0.00' to: 8.00'
type: Bentonite fm: 8.00' to: 10.50'
type: #10-20 Sand Filter fm: 10.50' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SP			67	SAND (SP): dark grayish brown, fine to medium grained, loose, damp.
15					0	
					60	SAND (SP): as above, dark gray, moist.
						Total Depth – 17.0' bgs.
20						

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: GeoProbe
Logged By: Tim Browning
Date(s): 09/16/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 17.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 1.00in fm: 0.0' to: 12.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 1.00in fm: 12.00' to: 17.00'

Annular Fill:
type: Grout fm: 0.00' to: 8.00'
type: Bentonite fm: 8.00' to: 11.00'
type: #10-20 Sand Filter fm: 11.00' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SM			50	SILTY SAND (SM): pinkish white, fine to medium grained, moist.
15					75	SILTY SAND (SM): as above, with black laminations at 15.8' to 16.5'.
						Total Depth – 17.0' bgs
20						

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BOREHOLE LOG

Site Id: VP-26

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: GeoProbe
Logged By: Tim Browning
Date(s): 09/16/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 17.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 1.00in fm: 0.0' to: 12.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 1.00in fm: 12.00' to: 17.00'

Annular Fill:
type: Grout fm: 0.00' to: 8.00'
type: Bentonite fm: 8.00' to: 11.00'
type: #10-20 Sand Filter fm: 11.00' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SM			46	SILTY SAND (SM): brown, fine grained, with gravel, moist.
		SP				SAND (SP): dark brown, medium grained, moist. SAND (SP): as above, fine grained.
15					83	SAND (SP): as above, medium grained.
						Total Depth – 17.0' bgs
20						

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BOREHOLE LOG

Site Id: VP-27

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: GeoProbe
Logged By: Tim Browning
Date(s): 09/16/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 17.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 1.00in fm: 0.0' to: 12.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 1.00in fm: 12.00' to: 17.00'

Annular Fill:
type: Grout fm: 0.00' to: 8.00'
type: Bentonite fm: 8.00' to: 10.83'
type: #10-20 Sand Filter fm: 10.83' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SP			63	SAND (SP): dark brown, fine grained, moist.
15					56	
						Total Depth – 17.0' bgs
20						

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: GeoProbe
Logged By: Tim Browning
Date(s): 09/16/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 17.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 1.00in fm: 0.0' to: 12.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 1.00in fm: 12.00' to: 17.00'

Annular Fill:
type: Grout fm: 0.00' to: 7.83'
type: Bentonite fm: 7.83' to: 10.83'
type: #10-20 Sand Filter fm: 10.83' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SP			60	SAND (SP): dark brown, fine to medium grained, moist.
15					100	SAND (SP): as above, gray.
						Total Depth – 17.0' bgs
20						

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BOREHOLE LOG

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: GeoProbe
Logged By: Tim Browning
Date(s): 09/16/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 17.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 1.00in fm: 0.0' to: 12.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 1.00in fm: 12.00' to: 17.00'

Annular Fill:
type: Grout fm: 0.00' to: 8.00'
type: Bentonite fm: 8.00' to: 10.92'
type: #10-20 Sand Filter fm: 10.92' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SP			56	SAND (SP): dark brown, medium grained, damp to moist.
15					100	SAND (SP): as above, with iron staining, red laminations.
						Total Depth – 17.0' bgs
20						

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BOREHOLE LOG

Site Id: VP-30

Project Number: 5477.60
Project Name: Atofina Chemicals
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: GeoProbe
Logged By: Tim Browning
Date(s): 09/16/03
Initial Water Level: NA

Total Depth: 17.00'
Completed Depth: 15.00'
Borehole Dia.: 8.25in

Blank Casing:
type: Stainless Steel Blank dia: 1.00in fm: 0.0' to: 10.00'

Screens:
type: Stainless Steel Type 304 size: 0.020in dia: 1.00in fm: 10.00' to: 15.00'

Annular Fill:
type: Grout fm: 0.00' to: 6.00'
type: Bentonite fm: 6.00' to: 9.00'
type: #10-20 Sand Filter fm: 9.00' to: 17.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Interval	Sample Recovery (%)	Description/Soil Classification
5						
10		SP				SAND (SP): dark brown, medium grained, moist.
		SM			63	SILTY SAND (SM): dark brown, medium grained, moist.
						SILTY SAND (SM): as above, with concrete fragments from 14.0-14.4'.
15		ML			67	SILT (ML): brown, soft, moist. SILT (ML): brown, sandy with well rounded gravel, concrete fragments.
						Total Depth - 17.0' bgs
20						

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/25/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 2.00' to: 17.00'
type: Bentonite Pellets fm: 17.00' to: 20.00'
type: 10-20 Sand fm: 20.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
						Gravel
5						
		SC				SILTY CLAYEY SAND (SC): reddish tan, slightly plastic, slightly moist.
10		SM				SILTY SAND (SM): red/tan, fine to medium grained, two 1.0" gray fine sand interbedded with silt layers, few black charcoal chunks in sand, slightly moist.
15		SC				SILTY SAND (SM): reddish brown, moist. SILTY CLAYEY SAND (SC): gray, fine grained, some magnetite and mica, saturated (perched water?).
20		SP				SAND (SP): red to brown, fine to medium grained, little to no silt, moist.
						SAND (SP): reddish brown, fine to medium grained, 1.0" layer of gray silt on top otherwise little to no fines, moist.
						SAND (SP): as above.
		SW				SAND (SW): reddish brown, well graded, no fines, moist.

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/25/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 2.00' to: 17.00'
type: Bentonite Pellets fm: 17.00' to: 20.00'
type: 10-20 Sand fm: 20.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		SW				SAND (SW): as above, saturated.
						SAND (SW): as above.
						SAND (SW): as above.
30						SAND (SW): as above.
						SAND (SW): as above.
						Total Depth - 32.0' bgs
35						
40						
45						

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/25/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 2.00' to: 18.00'
type: Bentonite Chips fm: 18.00' to: 20.00'
type: 10-20 Sand fm: 20.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
						Concrete
5						
		SC				SILTY CLAYEY SAND (SC): reddish tan, slightly plastic, slightly moist.
10		SM				SILTY SAND (SM): red/tan, fine to medium grained, two 1.0" gray fine sand interbedded with silt layers, few black charcoal chunks in sand, slightly moist.
15		SC				SILTY SAND (SM): reddish brown, moist. SILTY CLAYEY SAND (SC): gray, fine grained, some magnetite and mica, saturated (perched water?).
20		SP				SAND (SP): red to brown, fine to medium grained, little to no silt, moist.
						SAND (SP): reddish brown, fine to medium grained, 1.0" layer of gray silt on top otherwise little to no fines, moist.
						SAND (SP): as above.
		SW				SAND (SW): reddish brown, well graded, no fines, moist.

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/25/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 2.00' to: 18.00'
type: Bentonite Chips fm: 18.00' to: 20.00'
type: 10-20 Sand fm: 20.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		SW				SAND (SW): as above, saturated.
						SAND (SW): as above.
						SAND (SW): as above.
30						SAND (SW): as above.
						SAND (SW): as above.
						Total Depth - 32.0' bgs
35						
40						
45						

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/24/03
Initial Water Level: 26.00'

Total Depth: 33.00'
Completed Depth: 33.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 23.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 23.00' to: 33.00'

Annular Fill:
type: Bentonite Chips fm: 3.00' to: 6.00'
type: Grout fm: 6.00' to: 18.00'
type: Bentonite Pellets fm: 18.00' to: 21.00'
type: 10-20 Sand fm: 21.00' to: 33.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
						Asphalt.
5					12 10 11	Less than 1.0" of black gravel (asphalt?).
		SC				SILTY CLAYEY SAND (SC): reddish tan, slightly plastic, slightly moist.
10		SM			10 10 11	SILTY SAND (SM): red/tan, fine to medium grained, two 1.0" gray fine sand interbedded with silt layers, few black charcoal chunks in sand, slightly moist.
15		SC			3 2 3	SILTY SAND (SM): reddish brown, moist. SILTY CLAYEY SAND (SC): gray, fine grained, some magnetite and mica, saturated (perched water?).
20		SP			8 13 18 12 15 13 10 12 14 10	SAND (SP): red to brown, fine to medium grained, little to no silt, moist. SAND (SP): reddish brown, fine to medium grained, 1.0" layer of gray silt on top otherwise little to no fines, moist. SAND (SP): as above.
		SW				SAND (SW): reddish brown, well graded, no fines, moist.

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/24/03
Initial Water Level: 26.00'

Total Depth: 33.00'
Completed Depth: 33.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 23.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 23.00' to: 33.00'

Annular Fill:
type: Bentonite Chips fm: 3.00' to: 6.00'
type: Grout fm: 6.00' to: 18.00'
type: Bentonite Pellets fm: 18.00' to: 21.00'
type: 10-20 Sand fm: 21.00' to: 33.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		SW			15 15	SAND (SW): as above, saturated.
					6 6 26	SAND (SW): as above.
					5 10 7	SAND (SW): as above.
30					15 25	SAND (SW): as above.
						SAND (SW): as above.
						Total Depth – 33.0' bgs
35						
40						
45						

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(425) 462-8591

BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/24/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite Chips fm: 18.00' to: 21.00'
type: 10-20 Sand fm: 21.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
						Asphalt
5						
		SC				SILTY CLAYEY SAND (SC): reddish tan, slightly plastic, slightly moist.
10		SM				SILTY SAND (SM): red/tan, fine to medium grained, two 1.0" gray fine sand interbedded with silt layers, few black charcoal chunks in sand, slightly moist.
15		SC				SILTY SAND (SM): reddish brown, moist. SILTY CLAYEY SAND (SC): gray, fine grained, some magnetite and mica, saturated (perched water?).
20		SP				SAND (SP): red to brown, fine to medium grained, little to no silt, moist.
						SAND (SP): reddish brown, fine to medium grained, 1.0" layer of gray silt on top otherwise little to no fines, moist.
						SAND (SP): as above.
		SW				SAND (SW): reddish brown, well graded, no fines, moist.

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/24/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite Chips fm: 18.00' to: 21.00'
type: 10-20 Sand fm: 21.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		SW				SAND (SW): as above, saturated.
						SAND (SW): as above.
						SAND (SW): as above.
30						SAND (SW): as above.
						SAND (SW): as above.
						Total Depth - 32.0' bgs
35						
40						
45						

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/24/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite Chips fm: 18.00' to: 21.00'
type: 10-20 Sand fm: 21.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
						Asphalt
5						
		SC				SILTY CLAYEY SAND (SC): reddish tan, slightly plastic, slightly moist.
10		SM				SILTY SAND (SM): red/tan, fine to medium grained, two 1.0" gray fine sand interbedded with silt layers, few black charcoal chunks in sand, slightly moist.
15		SC				SILTY SAND (SM): reddish brown, moist. SILTY CLAYEY SAND (SC): gray, fine grained, some magnetite and mica, saturated (perched water?).
20		SP				SAND (SP): red to brown, fine to medium grained, little to no silt, moist.
						SAND (SP): reddish brown, fine to medium grained, 1.0" layer of gray silt on top otherwise little to no fines, moist.
						SAND (SP): as above.
		SW				SAND (SW): reddish brown, well graded, no fines, moist.

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BOREHOLE LOG

Project Number: 5226.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: B. Magee
Date(s): 11/24/03
Initial Water Level: NA

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: PVC Schedule 40 dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite Chips fm: 18.00' to: 21.00'
type: 10-20 Sand fm: 21.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		SW				SAND (SW): as above, saturated.
						SAND (SW): as above.
						SAND (SW): as above.
30						SAND (SW): as above.
						SAND (SW): as above.
						Total Depth - 32.0' bgs
35						
40						
45						

PROJECT NUMBER	BORING NUMBER	
115946.FW.ZZ	MWA-1	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Elf Atochem
LOCATION : Portland, Oregon
ELEVATION : 34.14 ft (PVC), 34.44 ft (casing)
DRILLING CONTRACTOR : Environmental West Exploration
DRILLING METHOD AND EQUIPMENT USED : Tubex - Air rotary, 6-inch diameter
WATER LEVELS : 17.62 feet from TOC, 12/12/96
START : 12/11/96 END: 12/11/96
LOGGER : Heidi Hoffmann

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
5	4-6	2 feet	SS-1	3-3-3-3	Sandy Silt, SM,tan, saturated, soft, laminated, Fe-oxide staining along laminae, mica, no odor, OVM = 0 ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
10	9-11	2 feet	SS-2	1-2-3-5	Sandy Silt, ML, dk green, reduced, saturated, soft, finely laminated, dk green and dk brown layers, mica, sand vs silt content changes along laminae, bottom 3 inches are clean sand, moist, no odor, OVM = 0.2 ppm (background)	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
15	14-16	2-feet	SS-3	2-3-3-3	Silty Sand, SM, dk greenish brown, saturated, laminated, sand is fine, mica, few pin-sized oily spots, no odor, OVM = 0 ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
20	19-21	2-feet	SS-4	3-6-8-13	Sand with Silt, SM, dk brown to greenish brown, saturated, laminated, silt content 5-10%, mica, few pin-sized oily spots concentrated at 20 feet, no odor	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0% Heaving Sands
25						
30						
35	30-31	2-feet	SS-5		Sand, SP, black, saturated, medium, loose, 5% lighter quartz, feldspars, no mica, strong H2S odor, OVM = 0 ppm	Heaving sands
					Bottom of hole = 33.5 feet	

PROJECT NUMBER	BORING NUMBER	
115946.FW.ZZ	MWA-2	SHEET 1 OF 1

SOIL BORING LOG

PROJECT :	Elf Atochem	LOCATION :	Portland, Oregon
ELEVATION :	36.48 ft (PVC), 36.39 ft (Protective casing)	DRILLING CONTRACTOR :	Environmental West Exploration
DRILLING METHOD AND EQUIPMENT USED :		Tubex - Air rotary, 6-inch diameter	
WATER LEVELS :	20.60 feet from TOC, 12/13/96	START : 12/12/96 END: 12/12/96	LOGGER : Heidi Hoffmann

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
5						Drill casing dropped from 5-10 feet, very soft silt
10					Silt, ML, brown, satuated, very soft. No sample-based on cuttings.	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
15					Silt, ML, brown, saturated, soft, no odor. No sample.	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
20	20-22	2 feet	SS-1	2-3-5-12	Silty gravel, GM, fill material, brown, saturated, some gray silt, slight odor, OVM = 0ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
	22-24	2 feet	SS-2	4-10-14-12	Sand, SP, dark brown and black, saturated, loose, 5% light grains, medium sand, no odor, OVM = 0ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
25	24-26	2 feet	SS-3	6-7-11-13	Sand, SP, rusty to black, saturated, loose, 5% light grains, medium sand, 1"silt layer at 25.5,slight odor, OVM=0ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
	27-29	2 feet	SS-4	2-4-6-9	Sand, SP, dk brown, rusty, saturated, loose, 5% light grains medium sand, 1"clay layer at 28', slight odor, OVM = 15ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
30	29-31	2 feet	SS-5		Sand, SP, dark brown, rusty, saturated, loose, 5% light grains, 10% silt, medium sand, slight odor, OVM = 14ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
35					Bottom of hole = 32 feet	

PROJECT NUMBER	BORING NUMBER	
115946.FW.ZZ	MWA-3	SHEET 1 OF 1

SOIL BORING LOG

PROJECT :	Elf Atochem	LOCATION :	Portland, Oregon
ELEVATION :	37.46 ft (PVC), 37.40 ft (Protective casing)	DRILLING CONTRACTOR :	Environmental West Exploration
DRILLING METHOD AND EQUIPMENT USED :		Tubex - Air rotary, 6-inch diameter	
WATER LEVELS :	22.44 feet from TOC, 12/13/96	START : 12/12/96 END: 12/12/96	LOGGER : Heidi Hoffmann

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
5						
10					Silt, ML, brown, moist, very soft. No sample - based on cuttings.	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
15					Silty Gravel, GM, brown, moist, soft, no odor. No sample - based on cuttings	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
20	20-22	3 inches	SS-1	2-3-5-4	Silty gravel, GM, fill material, brown, moist, no odor, OVM = 0ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
	22-24	8 inches	SS-2	2-3-4-6	Silty gravel, GM, fill material, brown, moist, no odor, OVM = 0ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
25	24-26	2 feet	SS-3		Sand, SP, rusty to black, saturated, loose, 5% light grains medium sand, 1"silt layer at 25.5,slight odor, OVM = 0ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
	27.5-29.5	2 feet	SS-4	2 for 2 feet	Sand, SP, dk brown, saturated, loose, 5% light grains medium sand, slight odor, OVM = 0 ppm	Downhole and Breathing Space: O_2=20.9% OVM=0.5ppm LEL=0%
30						
35					Bottom of hole = 32 feet	

PROJECT NUMBER	BORING NUMBER	
115496.FW.ZZ	MWA-4	SHEET 1 OF 1

SOIL BORING LOG

PROJECT :	Elf Atochem	LOCATION :	Portland, Oregon
ELEVATION :	36.46 ft (PVC), 36.42 ft (Protective casing)	DRILLING CONTRACTOR :	Environmental West Exploration
DRILLING METHOD AND EQUIPMENT USED :		Tubex - Air rotary, 6-inch diameter	
WATER LEVELS :	21.30 feet from TOC, 12/13/96	START : 12/13/96 END: 12/13/96	LOGGER : Heidi Hoffmann

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
5						
10					Silt, ML, brown, very soft, moist. No sample - based on cuttings	Downhole and Breathing Space: O_2=20.9% OVM = 0.5ppm LEL = 0%
15					Silty Gravel, GM, brown, moist, soft, no odor. No sample - based on cuttings.	Downhole and Breathing Space: O_2=20.9% OVM = 0.5ppm LEL = 0%
20	20-22	2 inches	SS-1	3-6-10-13	Silty gravel, GM, fill material, brown, moist, no odor, OVM = 0ppm	Downhole and Breathing Space: O_2=20.9% OVM = 0.5ppm LEL = 0%
25	24-26	2 feet	SS-2	1-2-10-14	Sand, SP, rusty to black, saturated, loose, 5% light grains medium sand, 1"silt layer at 25.5,slight odor, OVM = 0ppm	Downhole and Breathing Space: O_2=20.9% OVM = 0.5ppm LEL = 0%
	27.8-29.8	2 feet	SS-3	1-1-1-1	Sand, SP, dk brown, saturated, loose, 5% light grains medium sand, slight odor, OVM = 0 ppm	Downhole and Breathing Space: O_2=20.9% OVM = 0.5ppm LEL = 0%
30	30-32	2 feet	SS-4		30-31' Sand, SP, brown with creamy colored clay pieces, medium, loose 31-32': 2"laminated Silt with organic carbon, 4" brown laminated silt, 3" cream colored clay, 3" sand at bottom. Strong odor OVM = 22 ppm	
35					Bottom of hole = 32 feet	

Project No: 8601192.001.0622

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

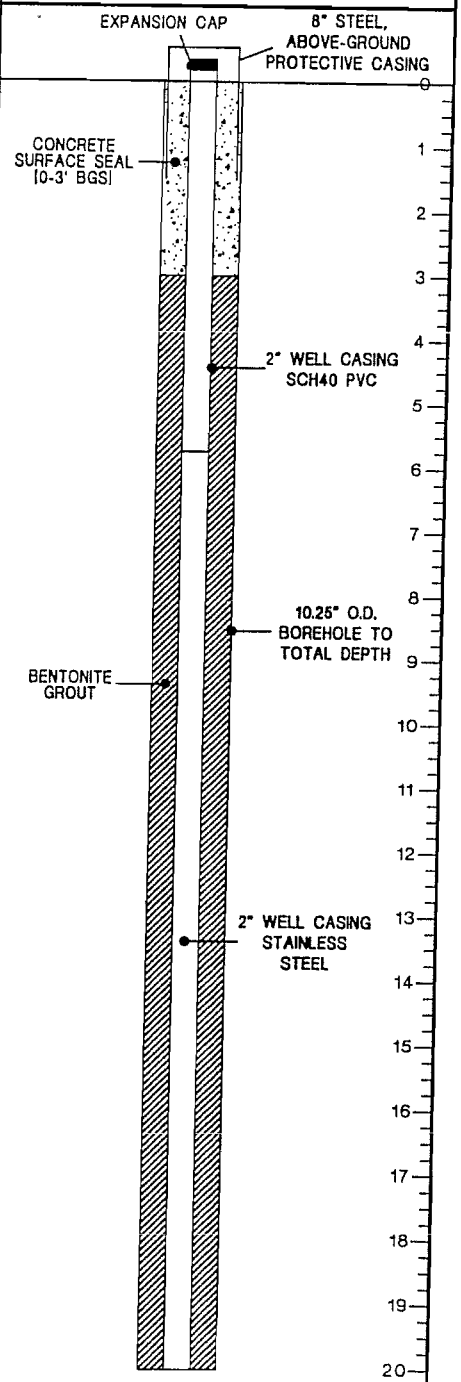
Monitoring well: MWA-5

Ground surface: Grass

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0–2							
2–3	SO0206	0	80%	2 4 5		SW	Fine to coarse SAND, very dark gray-brown (10YR3/2). Slightly moist, loose, no odor.
3–4	SO0207	0	80%	7 9 5			
4–5	SO0208	0	100%	5 5 5			
5–6	SO0210	0	100%	5 4 4			
6–7	SO0211	0	100%	5 5 4			
7–8	SO0212	0	100%	3 4 4			
8–9	SO0213	0	100%	6 6 7			
9–10	SO0214	0	100%	5 5 7			
10–11	SO0215	0	100%	5 5 6			
11–12	SO0216	0	100%	6 8 8			Color change to brown (10YR 5/3).
12–13	SO0217	0	100%	8 8 9			
13–14	SO0218	0	100%	9 12 12			

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 12 January 1999

Well Casing Elevation: 37.07'

Ground Surface Elevation: 34.96'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.001.0622

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

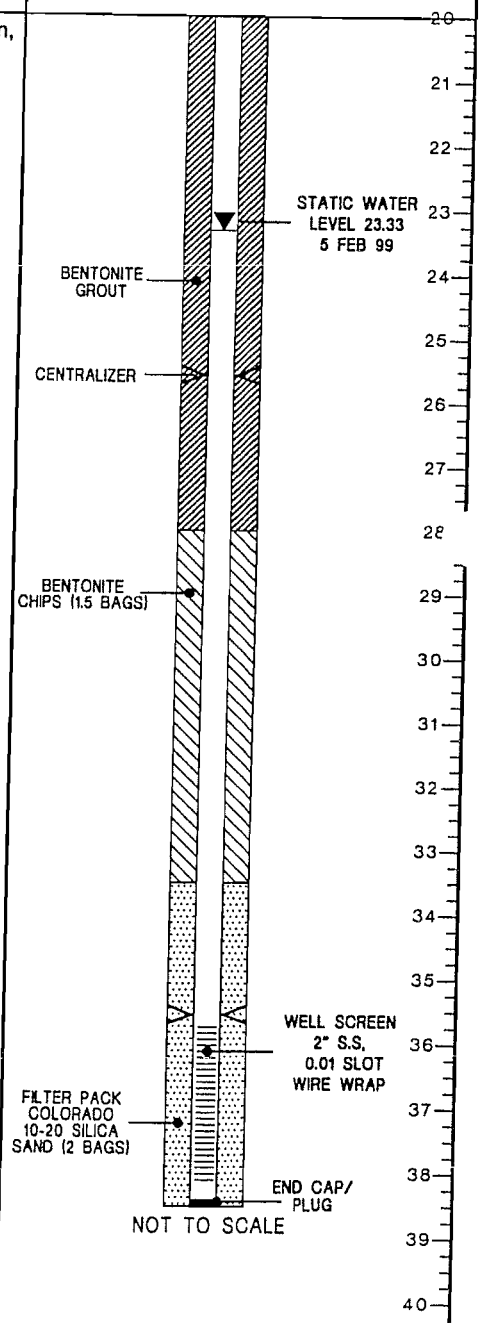
Monitoring well: MWA-5

Ground surface: Grass

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO0219	0	100%	7 11 11		SW	Fine to coarse SAND, very dark gray-brown, (10YR3/2), slightly moist, no odor.
21–22	SO0220	0	100%	8 8 9			
22–23	SO0221	0	100%	7 8 9			
23–24	SO0222	0	100%	7 9 10			
24–25	SO0223	0	100%	50 for 6"			Same as above w/ trace SILT (~2%).
25–26	SO0224	2.2	100%	10 11 15			
26–27	SO0225	0	100%	13 25 33			Wood debris @ 30' Color change to black (N2.5/0), wet.
27–28	SO0226	0	100%	11 20 23			Color change to very dark gray-brown, (2.5Y3/1).
28–29	SO0227	0	100%	10 14 22			
29–30	SO0228	0	100%	12 13 14			
30–31	SO0229	0	100%	8 11 16			
31–32	SO0230	0	100%				Occasional wood debris.
32–33	SO0231	0	100%				
33–34						ML	SILT, black (2.5Y 2.5/1) moist, no odor.
34–35							Total depth 39.0'

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 12 January 1999

Well Casing Elevation: 37.07'

Ground Surface Elevation: 34.96'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.001.0622

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

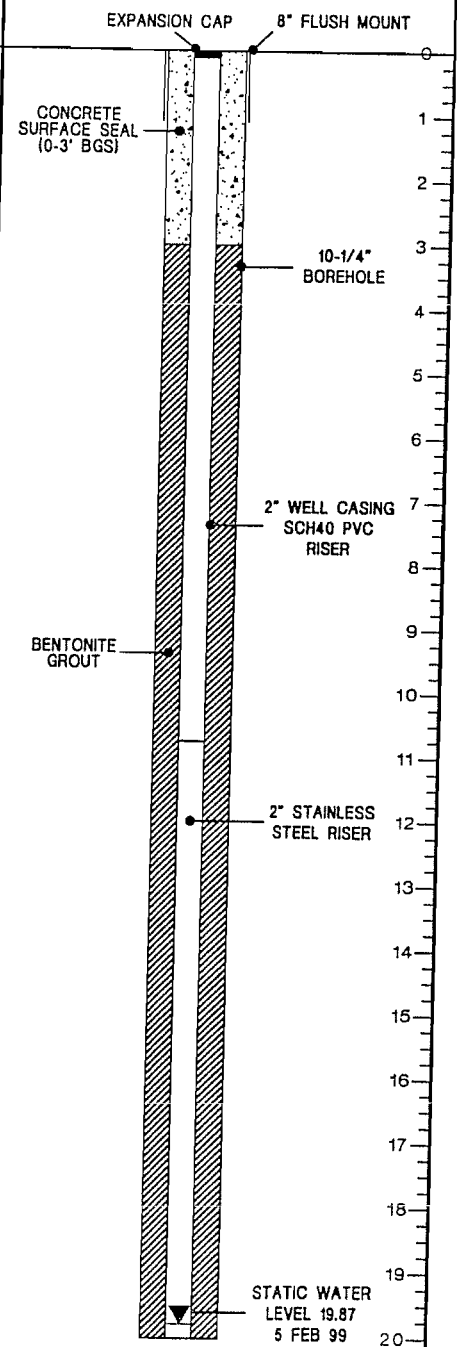
Monitoring well: MWA-6

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
3–4	SO0232	0	50%	10 10 9		SW	Fine to coarse SAND, dark gray-brown (10 YR 4/2), slightly moist, no odor, very loose (fill).
5	SO0233	0	80%	6 3 3			Trace fine gravel ~2%.
7	SO0234	0	90%	5 3 2			Increasing silt, moist, loose.
8	SO0235	2.2	100%	2 2 2			Same as above w/o silt.
10	SO0236	0	100%	2 2 2			
11	SO0237	0	50%	11 7 9			Same as above, w/o gravel.
12–13	SO0238	3.1	100%	4 5 15		GW	GRAVEL - slag
14	SO0239	0	100%	5 5 9		SW/ GW	Fine to coarse SAND and GRAVEL w/ slag (~30%), dark gray-brown (10 YR 4/2), slightly moist, no odor (fill).
16	–	6.7	0%	10 10 9			Cuttings indicate gravel.
17	–	0	0%	10 10 10			Cuttings indicate gravel.
19	SO0240	0	100%	4 5 6		ML/ CL	Slightly clayey SILT w/ trace very fine sands and trace construction debris, (brick and wood), dark gray (5 YR 4/1), slightly plastic, moist (fill).

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 13 January 1999

Well Casing Elevation: 34.27'

Ground Surface Elevation: 34.78'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.001.0622

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

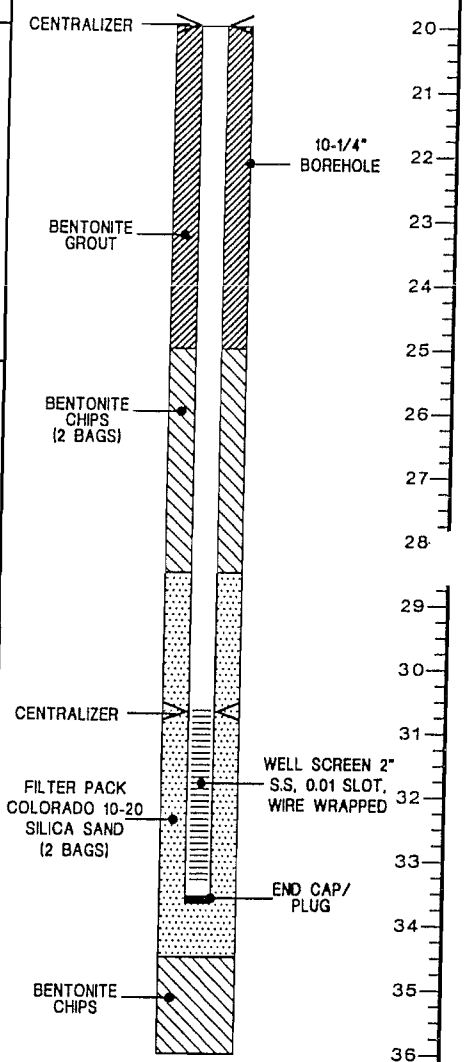
Monitoring well: MWA-6

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO0241	0	10%	4 4 2		ML/CL	Slightly clayey SILT w/ construction debris, dark gray (5Y 4/1) grading to silty clay, moderately plastic w/ some carbonized wood, wet to moist, no odor (fill).
21–22	SO0242	0	100%	3 4 5			
22–23	SO0243	0	100%	7 8 9			Trace brick fragments and color change to yellow-brown (10 YR 4/4) with rust red mottling.
23–24	SO0244	2.2	30%	7 9 10			Irregular zones of dark gray (5Y4/1) and yellow-brown (10YR 4/4).
24–25	SO0245	0	25%	50 for 6"		SW	Fine to coarse SAND, dark gray-brown (10YR4/2), wet, no odor.
25–26	SO0246	0	100%	10 11 15			Grading coarser w/ depth
26–27						ML	SILT with (~ 2" thick beds).
27–28	SO0247	0	100%	13 25 33		SW	Fine to coarse SAND w/ trace silt (~ 2-3%) and gravel (~ 2%), dark gray-brown (10YR4/2), wet, no odor.
28–29	SO0248	0	100%	11 20 23			as above, no gravel.
29–30	SO0249	0	100%	10 14 22			Grading finer w/ depth w/ trace silt.
30–31							Thin silt lens @ 30'
31–32	SO0250	0	100%	12 13 14			as above, w/ trace fine to medium gravel (2-4%), dark gray-brown (10YR4/2), wet, no odor.
32–33	SO0251	0	100%	8 11 16			
33–34						ML	SILT, dark gray-brown (2.5Y4/2)
34–35						SP	Fine to medium SAND (volcanic) black (N2.5/0)
35–36							Total depth @ 36.0' BGS
36–37							
37–38							
38–39							
39–40							

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 13 January 1999

Well Casing Elevation: 34.27'

Ground Surface Elevation: 34.78'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

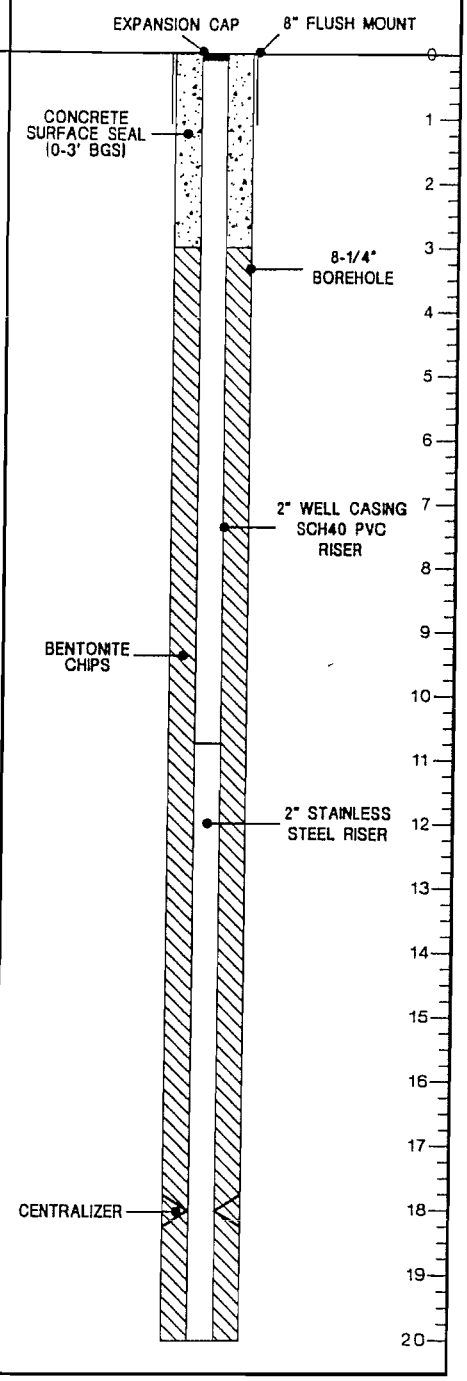
Location: Portland, OR

Monitoring well: MWA-6r

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
5–6.5	SO0342	3.6	100%	5 5 6	X	SW	Fine to coarse SAND w/ trace rounded fine to medium gravel (~2%) dark grey-brown (10YR 4/2), slightly moist (fill)
9							wood debris up to 18"
10–11.5	SO0343	0	100%	6 3 3	X		as above w/ horizons of silty, gravelly clay
13						ML	
15–16.5	SO0344	0	100%	7 18 35	X		Slightly clayey SILT w/ trace construction debris (brick and wood) and slag, dark grey (5YR 4/1), w/ rust red mottling, moist (fill)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 4 August 1999

Well Casing Elevation: 34.55'

Ground Surface Elevation: 34.85'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.001.0723
Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

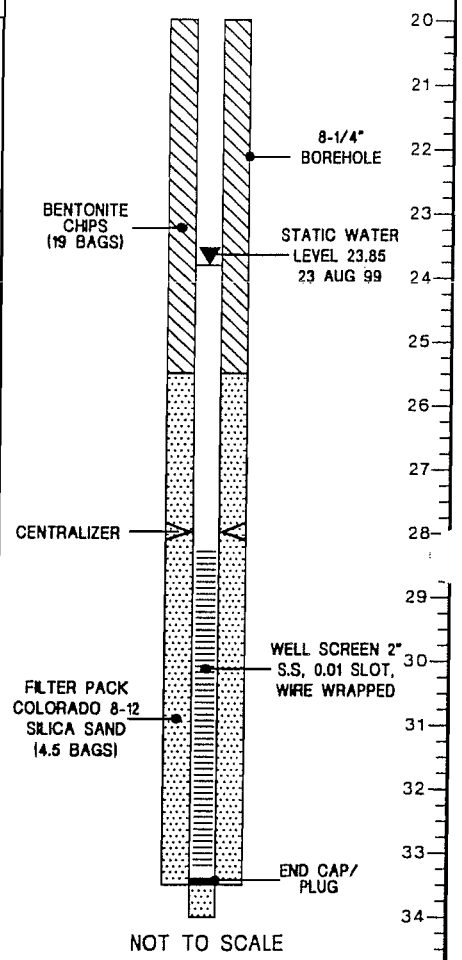
Monitoring well: MWA-6r

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–23	SO0345	3.6	100%	15 18 23		ML/CL	Slightly clayey SILT w/ construction debris (slag and wood), dark grey (5YR 4/1) w/ rust red mottling, grading to silty clay, moderately plastic, moist (fill)
22–23	SO0346	0	100%	8 13 13			
23–24	SO0347	3.6	80%	50 for 6"		SP	Fine to medium SAND w/ trace fine rounded gravel (~3%), dark grey-brown (10YR 4/2), wet (fill)
25–26	SO0348	0	100%	20 50 for 6"			as above w/ silty angular basalt gravel <2.5"
26–27	SO0349	0	100%	20 30 36			Heaving sands below 26.5'
							Silt lens ~ 1/8" thick
28–29	SO0350	9.1	100%	30 50 for 6"			
							Silt lens ~ 1/8" thick
29–30	SO0351	5.4	100%	30 50 for 6"			Color change to brown (7.5YR 4/3) to dark grey-brown (10YR 4/2), wet
31–32	SO0352	5.4	100%	12 27 40			
							Silt lens ~2" w/ carbonized organics, very dark grey (5Y 3/1), wet
32–33	SO0353	3.6	100%	50 for 6"			Color change to dark grey-brown (10YR 4/2), wet
33–34	SO0354	5.4	100%	50 for 6"			
34						ML	Silt, dark grey-brown (2.5Y 4/2)
							Total depth @ 34.0' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 4 August 1999

Well Casing Elevation: 34.55'

Ground Surface Elevation: 34.85'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.001.0622

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

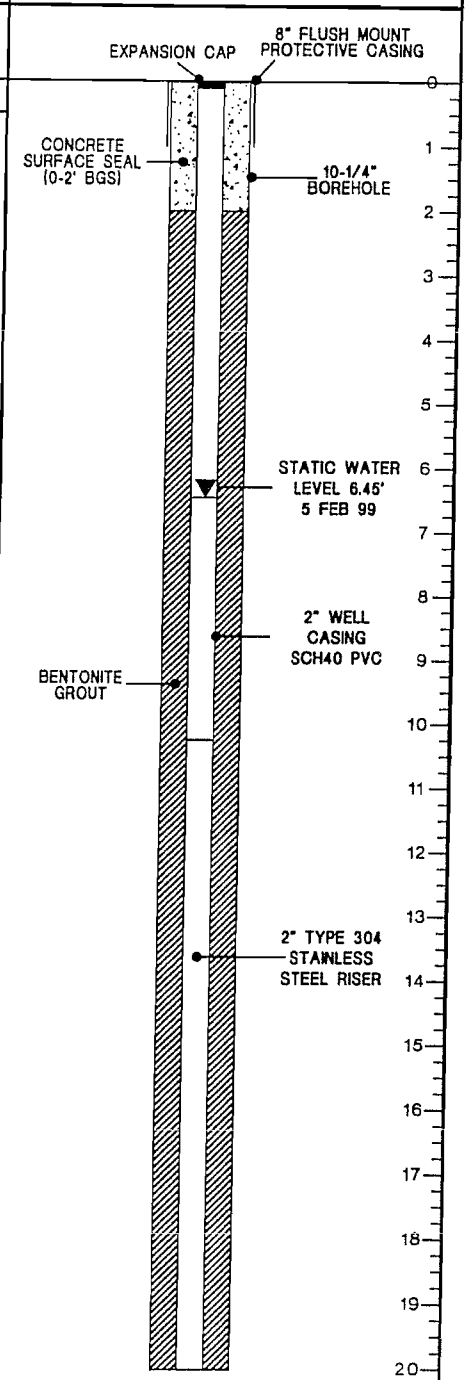
Monitoring well: MWA-7

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GW	GRAVEL (fill).
3–20						SM	Silty, fine to medium SAND, dark gray-brown (10YR4/2), wet, no odor.
3	SO0186	0	80%	4 5 6			
5	SO0187	0	90%	3 34 4			
6	SO0188	0	90%	2 2 2		ML	Fine, sandy micaceous SILT, dark gray-brown (2.5Y4/2), wet, no odor.
8	SO0189	0	100%	1 1 1			
9	SO0190	0	100%	1 1 1			
10						SM	Silty, fine to medium SAND, dark gray-brown (10YR4/2), wet, no odor.
11	SO0191	0	100%	5 7 8			
12	SO0192	0	100%	6 8 10			Color change to dark gray (5Y4/1)
14	SO0193	0	100%	4 3 2			
15						ML	SILT, dark gray (5Y4/1), wet, no odor.
16	SO0194	0	100%	5 6 12		SP	Fine to medium SAND (volcanic), black (N2.5/0), wet, no odor.
17	SO0195	0	100%	5 6 7			
19	SO0196	0	100%	4 6 8			
20							

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 12 January 1999

Well Casing Elevation: 34.29'

Ground Surface Elevation: 34.21'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

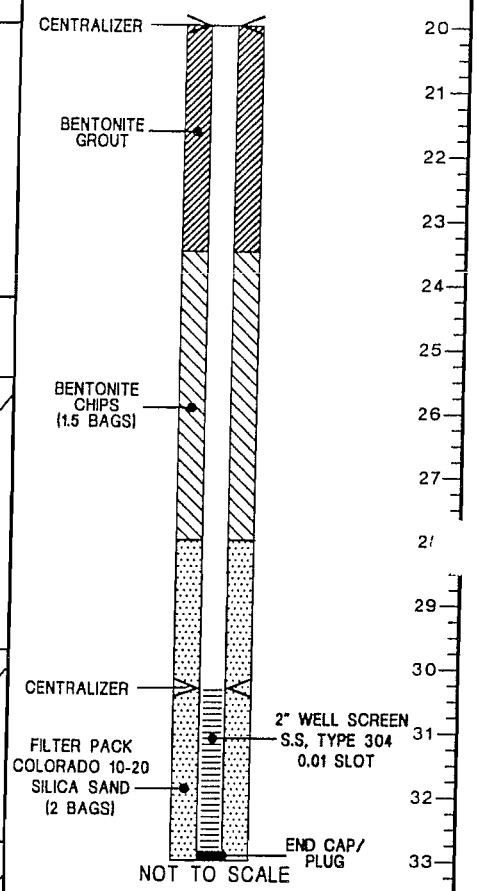
Monitoring well: MWA-7

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO0197	0	100%	6 10 17		SP	Fine to medium SAND (volcanic), black (N2.5/0), wet.
21–22	SO0198	0	100%	7 9 13			
22–23	SO0199	0	50%	5 13 16			
23–24	SO0200	0	100%	10 13 17		SM	Silty fine to medium SAND (volcanic), black (5Y2.5/1), moist, no odor.
24–25						ML	SILT lens.
25–26	SO0201	0	100%	4 11 12		SP	Fine to medium SAND (volcanic), black (N2.5/0), moist, no odor.
26–27	SO0202	0	100%	4 9 14			
27–28	SO0203	0	100%	8 9 10			
28–29						ML	SILT lens.
29–30	SO0204	0	100%	8 7 6		SM	Slightly silty, fine to medium SAND (volcanic), black (N2.5/0), wet, no odor.
30–31	SO0205	0	100%	8 6 12			
31–33						ML	SILT to fine, sandy SILT, very dark gray-brown (10YR3/2), moist to wet, no odor. Total depth 33' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 12 January 1999

Well Casing Elevation: 34.29'

Ground Surface Elevation: 34.21'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

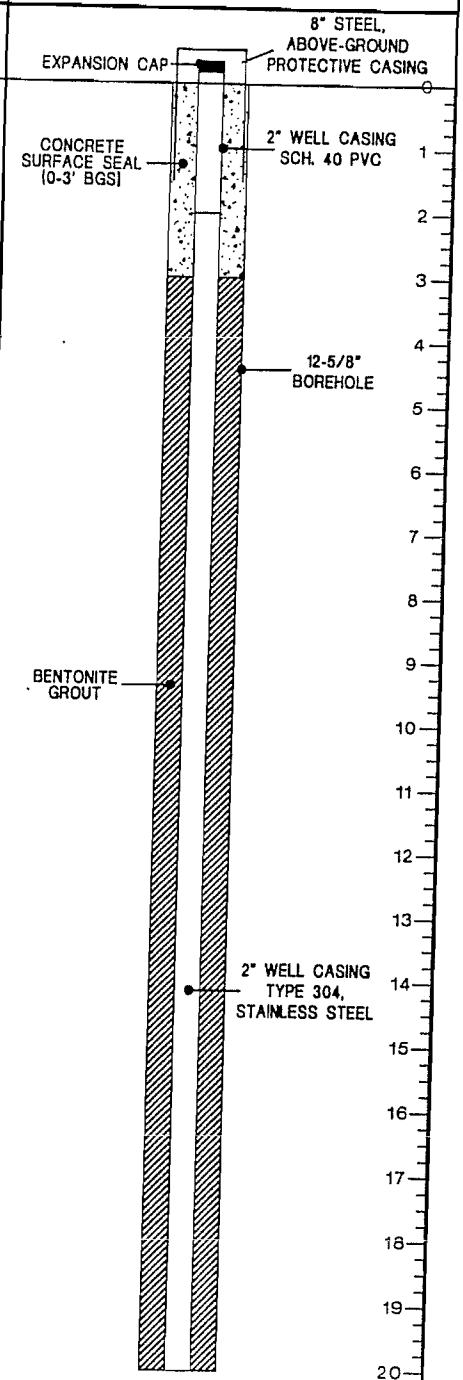
Monitoring Well: MWA-8i

Ground surface: Native vegetation, grasses and weeds w/ coarse sand

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0–4						SM	Cuttings indicate silty sands
4–20						ML/GM	Gravelly SILT w/ fine to coarse gravel (~ 30 to 50%) and trace carbonized organics (~ 5 %), brown (10YR4/3) w/ rust red mottling, moist, (Fill).
5–7	SO0020	0	50%	12 7 6 6	X		
10–12	SO0021	0	60%	4 7 7 10	X		
15–17	SO0022	0	0%	6 4 8 35	X		
4–20							Cuttings indicate silty basalt gravel.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable Tool

Drill Date: 9 - 11 January 1999

Well Casing Elevation: 36.10'

Ground Surface Elevation: 33.79'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

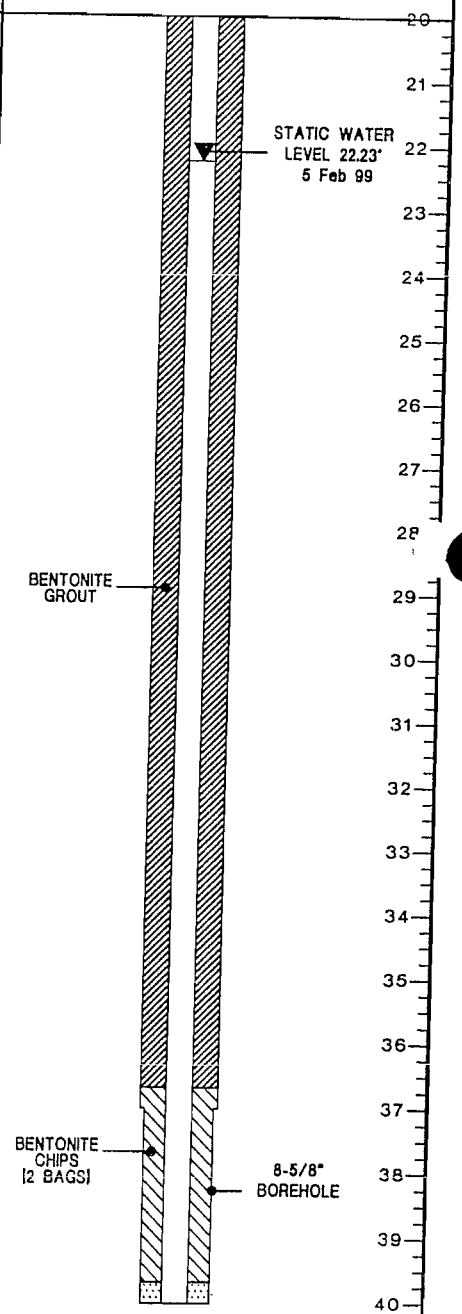
Monitoring Well: MWA-8i

Ground surface: Native vegetation, grasses and weeds
coarse sand

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO0022	1.1	50%	8 4 4 6		GM/ ML	Silty, clayey, sandy, GRAVEL to gravelly, sandy, clayey SILT, trace brick debris, very dark gray-brown (2.5Y3/2), moderate plasticity, moist (Fill).
22–23	SO0023	0	75%	40 40 40 40		SP	Fine to medium SAND, very dark gray-brown (2.5Y3/2), moist.
24–25	SO0024	1.1	100%	25 35 30 30			
26						SM	Silty SAND, black (2.5Y2.5/1), moist.
27–28	SO0025	1.1	75%	20 20 25 30		SP	Fine to medium SAND, very dark gray-brown (2.5Y3/2).
29	SO0026	3.4	100%	13 20 26 30			
30						ML	SILT lens w/ carbonized organic material.
31	SO0027	43	70%	7 8 10 13		SP	Fine to medium SAND, very dark gray-brown (2.5Y 3/2), moist.
32						SM	Slightly silty, fine SAND, black (2.5Y2.5/1)
						ML	SILT w/ trace organics, black to dark gray (2.5Y4/1)
33	SO0028	–	100%	6 7 8 13		ML	Slightly silty, fine SAND, black (2.5Y2.5/1), wet, sheen.
	SO0029	8.9	100%				Fine sandy SILT to SILT, black (2.5Y 2.5/1), moist.
34	SO0030	115	100%	16 32			
35	SO0031	–	100%			SP	Slightly silty, fine to medium SAND, very dark gray (2.5Y3/1), wet.
36							Residual NAPL observed (36 -36.3')
	SO0032	–	100%			ML/ CL	Clayey SILT, very dark gray (2.5Y3/1) stiff, slightly plastic, moist.
37	SO0033	–	100%				
38						SP	No recovery, cuttings indicate silty, fine SAND, black (2.5YR 2.5/0).
39–40	–	–	0%				

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable Tool

Drill Date: 9 - 11 January 1999

Well Casing Elevation: 36.10'

Ground Surface Elevation: 33.79'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

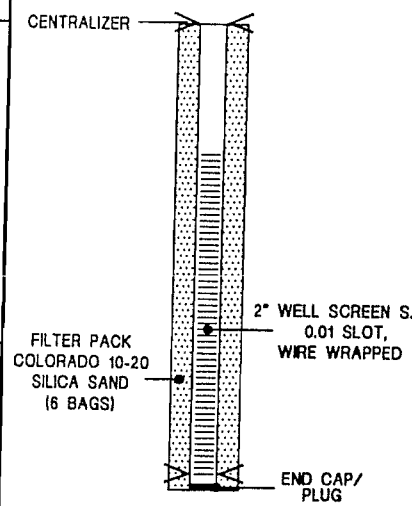
Monitoring Well: MWA-8i

Ground surface: Native vegetation, grasses and weeds w/ coarse sand

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–42	SO0034	5.2	100%	1 3 8 9		SP	Slightly silty, fine to medium SAND, volcanic, black (2.5YR 2.5/0), wet.
43–44	SO0035	26	75%	4 5 10 14			
45–46	SO0036	5	100%				
						ML	SILT, brown (10YR4/3), moist to wet.
						SM	Silty, fine SAND, brown (10YR4/3)
47–48	SO0037	0	100%	6 3 8 10		ML	SILT grading to clayey SILT, brown (10YR4/3), wet, slightly plastic.
49	SO0038	0	50%	3 50/3"			Trace angular basalt gravel (~ 10%).
							Total depth 49.0' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable Tool

Drill Date: 9 - 11 January 1999

Well Casing Elevation: 36.10'

Ground Surface Elevation: 33.79'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

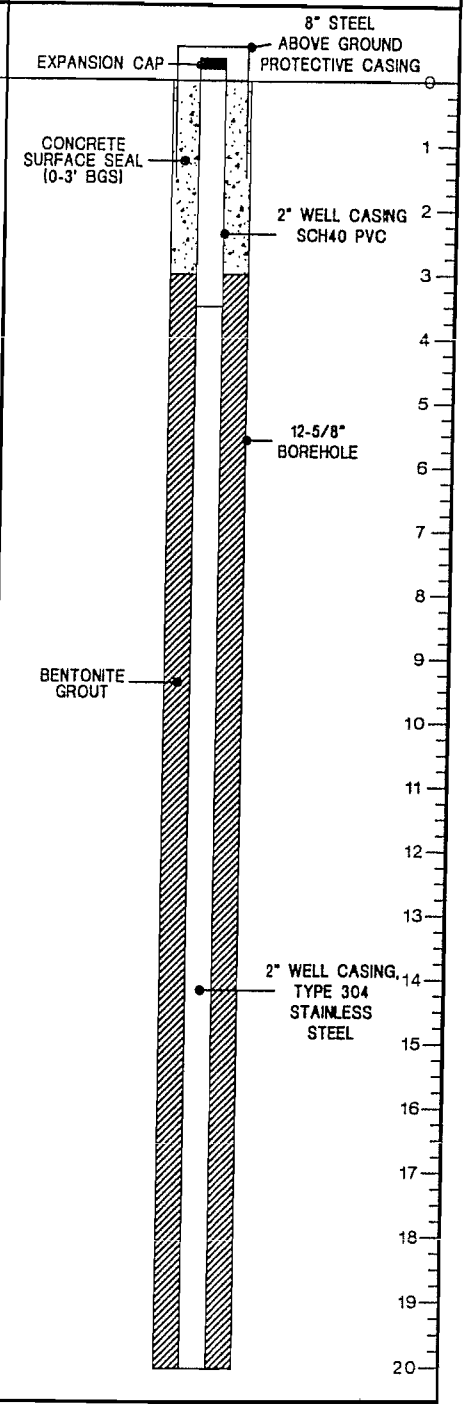
Monitoring Well: MWA-9i

Ground surface: Native vegetation, grasses and weeds

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0							
1							
2							
3							
4							
5							
6		0	20%	6 5 4 4		ML/ GM	Sandy gravelly SILT to silty GRAVEL, brown (10YR4/3), moist, (fill).
7							
8							
9							
10							
11		0	10%	5 5 7 7			
12							
13							
14							
15							
16	SO0039	0	25%	4 4 8 6			
17							
18							
19							
20							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 13 - 17 November 1998

Well Casing Elevation: 36.81'

Ground Surface Elevation: 34.76'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

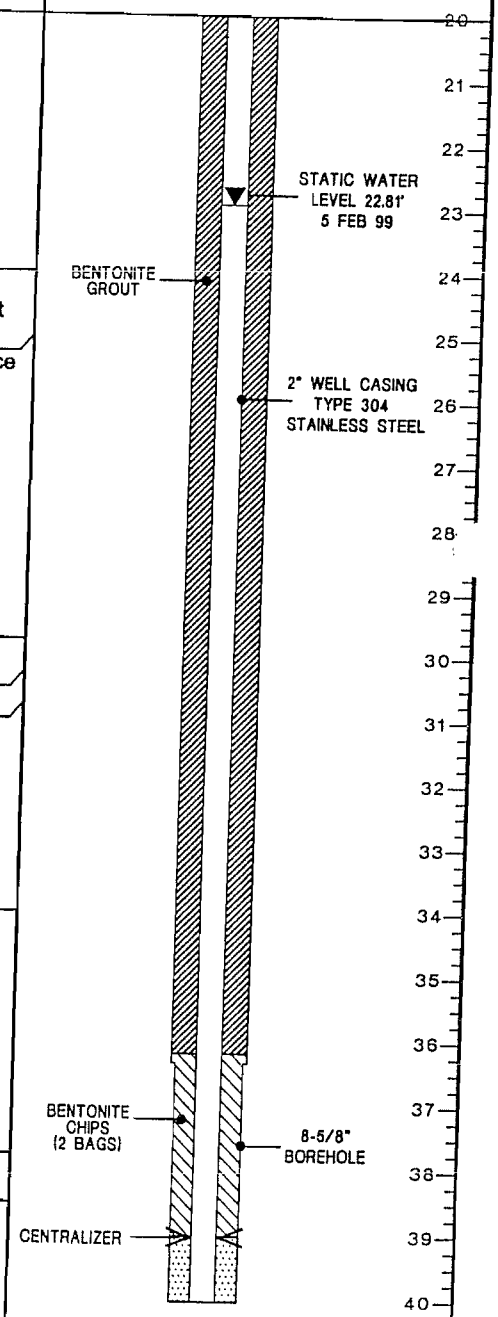
Monitoring Well: MWA-9i

Ground surface: Native vegetation, grasses and weeds

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–22	SO0040	0	25%	4 4 4 4		ML/GM	Silty GRAVEL to gravelly SILT w/ basalt gravel (>3") (fill).
22–24	SO0041	0	10%	8 20 30 35			
24–26	SO0042	0	15%	75 75 0		AS	Very hard, black and yellowish-green asphalt-like material w/ wire, nails, asphalt like odor (fill).
						SP	Fine to medium SAND, slightly silty w/ trace coarse sand (~ 10%) very dark brown (10YR2/2), moist
26–28	SO0043	0	25%	20 20 25 30			
28–30	SO0044	0	50%	20 32 25 36			
30–32	SO0045	3.5	100%	5 8 13 15		SM	Silty fine SAND, very dark gray (2.5Y 3/1), moist to wet.
						ML	SILT, very dark gray (10YR3/1), moist.
						SM	Silty, fine to medium SAND, pale yellow (2.5Y8/2), no odor.
32–34	SO0046	13.0	100%	6 9 10 12			Becoming less silty with depth.
34–36	SO0047	32.8	25%	20 30 30 35		SP	Slightly silty, fine to medium SAND, dark brown (2.5Y4/2) w/ trace organic material (wood) (~ 2%), wet.
36–38	SO0048	1260	80%	10 15 17 25			As above, color change to reddish-brown (5Y5/3), strong odor.
						ML	SILT, pale yellow (2.5Y8/2) and dark gray-brown (2.5Y4/2), moist.
38–40	SO0049	430	100%			SP	Fine to medium SAND, volcanic, black (N2.5/0), trace silt (~ 2-5%), wet, no sheen.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 13 - 17 November 1998

Well Casing Elevation: 36.81'

Ground Surface Elevation: 34.76'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

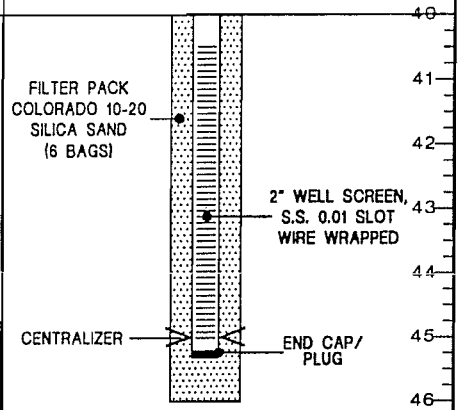
Monitoring Well: MWA-9i

Ground surface: Native grass and weeds

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41	SO0051	224	100%	7 5 5 5		SP	Fine to medium SAND, volcanic, black (N2.5/0), trace silt.
41–43	SO0052	350	100%	3 5 5 7			Heaving sand
43–45	SO0053	429	100%	3 8 8 10		ML/CL	SILT grading to clayey SILT, dark gray-brown (2.5Y4/2), moist.
45–47	SO0054	99.6	100%	4 6 7 10			
47–48							Total depth 48.0' BGS

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 13 - 17 November 1998

Well Casing Elevation: 36.81'

Ground Surface Elevation: 34.76'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

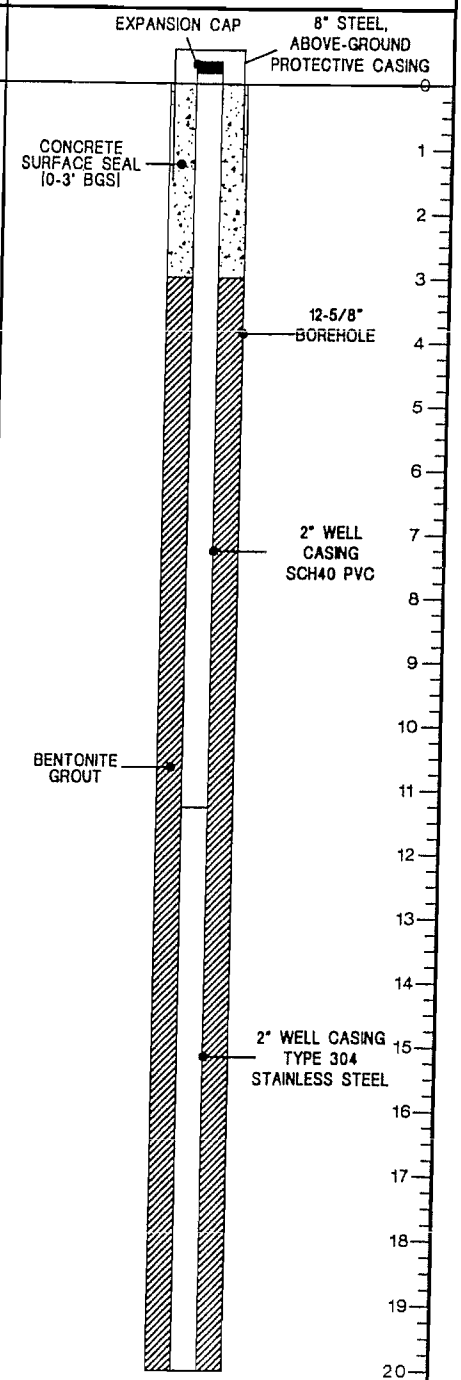
Monitoring Well: MWA-10i

Ground surface: Native grass and weeds

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0							
1							
2							
3							
4							
5						ML	Very fine, sandy SILT, very dark gray (5Y3/1), w/ trace gravel (~ 5%), up to 2", slightly plastic, moist.
6	SO0055	0	50%	5 3 3 3	X		
7							
8							
9							
10							As above, increasing gravel fraction (~ 5-10%).
11	SO0056	0	70%	1 2 2 2	X		
12							
13							
14							
15							As above, trace root fragments
16	SO0057	0	50%	3 4 5 4	X		
17							
18							
19							
20							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 19 - 23 November 1998

Well Casing Elevation: 35.90'

Ground Surface Elevation: 33.71'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

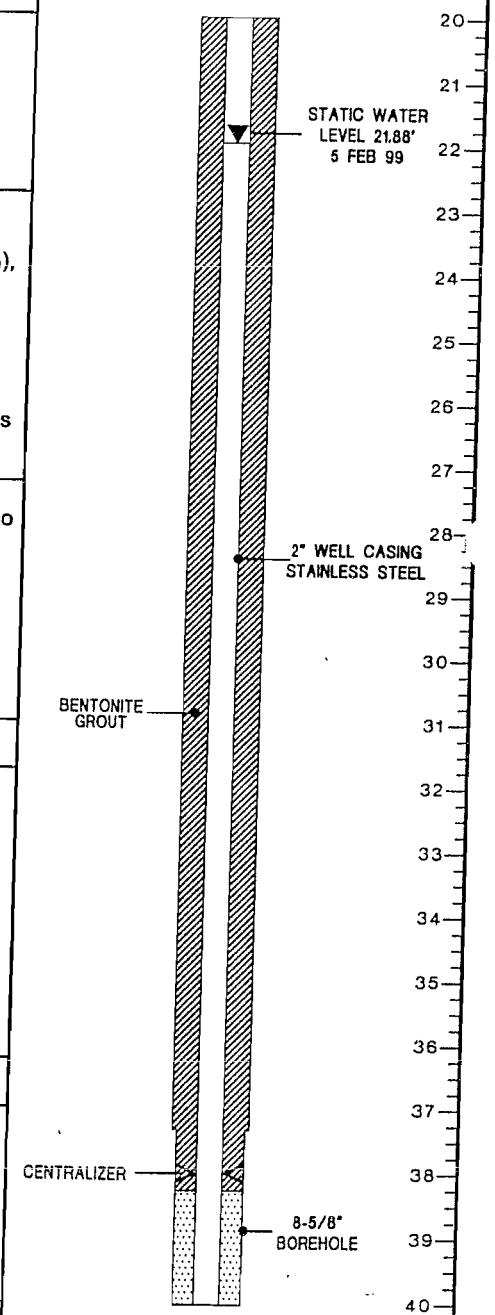
Monitoring Well: MWA-10i

Ground surface: Native grass and weeds

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–22	SO0058	0	25%	6 6 6 9		ML/GM	Silty, sandy GRAVEL (< 3"), brown (10YR4/3), moist, no odor.
22–24	--	0	0%	20 20 20 50-1"		SP	Fine to medium SAND w/ trace silt (~ 2-5%), dark gray (2.5Y4/1) grading to dark gray-brown (2.5Y4/2), moist, no odor.
24–26	SO0059	0	100%	30 20 20 25			
26–28	SO0060	0	50%	15 15 20 22			Color change to gray (2.5Y6/1) w/ silt lenses at 26.75' and 27.4'
28–30	SO0061	22	75%	15 10 7 15		SM	Silty, fine to medium SAND, dark gray (2.5Y4/1) w/ pale yellow sand grains, wet, no odor. SILT lenses (1/4") at 29' and 29.6'
30–32	SO0062	85	100%	16 18 22 30		ML	SILT, dark gray (2.5Y4/1) to pale yellow (2.5Y8/4)
32–34	SO0063	73	75%	10 12 13 17		SM	Silty, fine to medium SAND, dark gray (2.5Y4/1) to pale yellow (2.5Y8/4), wet
34–36	SO0064	--	100%	10 13 16 14			
36–38	SO0065	--	100%	5 11 15 20		ML	SILT, very dark gray (5Y3/1)
38–40	SO0066	4.7	100%	4 6 9 15		SP	Fine to medium SAND, volcanic, black (5Y2.5/1), wet w/ trace wood. Silty sand lens from 39.2' - 39.5'.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 19 - 23 November 1998

Well Casing Elevation: 35.90'

Ground Surface Elevation: 33.71'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

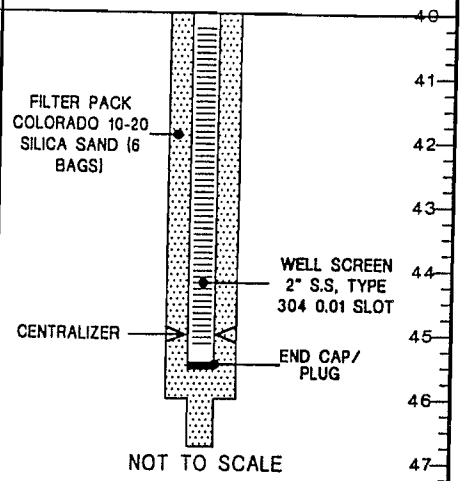
Monitoring Well: MWA-10i

Ground surface: Native grass and weeds

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41	SO0067	21.5	100%	3 6 10 35		SP	Fine to medium SAND, volcanic, black (5Y2.5/1) wet
41–42							As above, trace organic matter
42–43	SO0068		100%	6 10 11 20			
43–44							
44–45	SO0069		100%	7 15 20 30			
45–46						ML/CL	Clayey SILT, olive gray (5Y4/2), slightly plastic, moist
46–47	SO0070		100%				
47							Total depth 46.8' BGS
48							
49							
50							
51							
52							
53							
54							
55							
56							
57							
58							
59							
60							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 19 - 23 November 1998

Well Casing Elevation: 35.90'

Ground Surface Elevation: 33.71'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

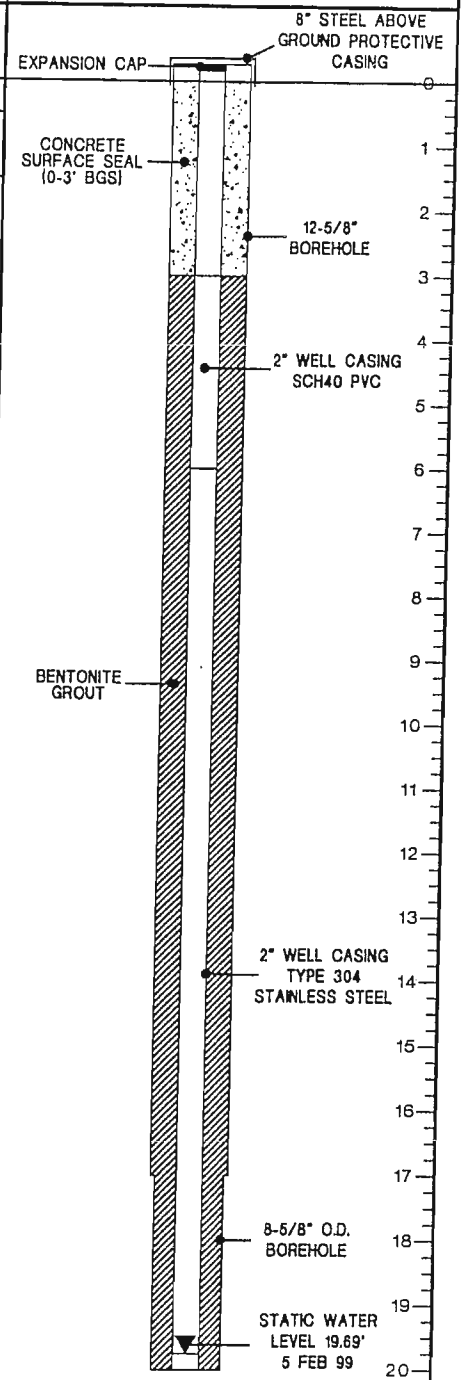
Monitoring Well: MWA-11i

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0							Asphalt
1	SO0071	0	60%	6 40 25		SP	Fine to medium SAND, dark brown (7.5 YR 3/2), moist.
2						SP/GW	Fine to medium SAND w/ trace concrete/ basalt debris, dark gray (10YR4/1), moist.
3	SO0072	6.5	60%	18 18 18 23			As above, w/ gravel ~ 30%, dark gray-brown (2.5R4/1), moist, crystalline substance (~1" thick) w/ pinkish hue.
4						SP	Very fine to fine SAND w/ trace silt, gray (10YR6/1), moist, stiff.
5	SO0073	1071	50%				As above, w/ occasional gravel, light gray (10YR7/1) w/ pinkish hue.
6						ML	SILT, pale yellow (2.5Y8/3).
7	SO0074	1973	80%	16 15 17 20		SP	Very fine SAND w/ trace silt, gray (10YR6/1) w/ pinkish hue, moist.
8						ML	SILT, pale yellow (2.5Y8/3).
9			0%				
10						SM/ML	Very fine silty SAND and SILT, alternating beds (~ 1-2"), dark gray-brown (2.5Y4/2) and light brown-gray (2.5Y6/2), moist.
11	SO0075	0	80%	7 10 15 7			
12							
13	SO0076	1892	100%	7 7 7 15			
14							
15	SO0077	2251	60%	4 4 4 4			Color change to pale yellow (2.5Y8/3).
16						SP	Fine to coarse SAND, very dark gray-brown, (2.5Y8/3), moist.
17	SO0078	826	100%	7 10 12 8			
18							
19	SO0079	621	100%	10 12 15 7			
20							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 30 November - 3 December 1998

Well Casing Elevation: 34.50'

Ground Surface Elevation: 34.70'

Hole Size: See construction detail

Datum: City of Portland Datum -1929

Sheet: 1 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

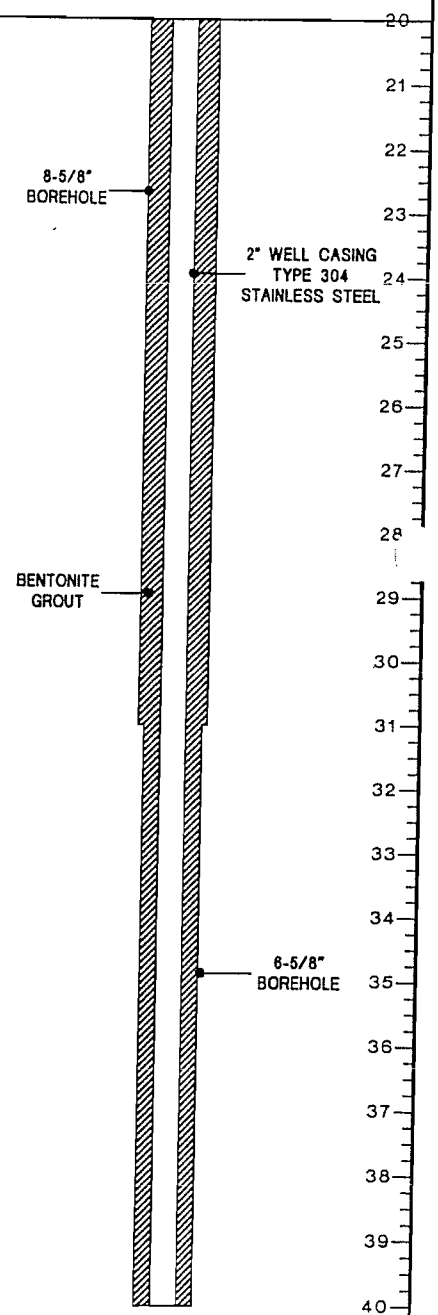
Monitoring Well: MWA-11i

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO0080	472	100%	6 15 14 13		SP	Fine to coarse SAND, very dark gray-brown (2.5Y 8/3), moist.
21–22							
22–23	SO0081	530	100%	5 7 10 18			
23–24							
24–25	SO0082	787	100%	5 13 18 35			Color change to gray (2.5 Y 5/1) w/ trace silt, wet.
25–26							
26–27	SO0083	28	100%	4 8 12 20			Color change to light yellow-brown, silt (~10%).
27–28							Grading coarser w/ depth w/ carbonized organics.
28–29	SO0084	–	100%	12 20 25 25			Grading to silt.
29–30						ML	SILT, black (5Y2.5/1), wet, no odor.
30–31	SO0085	0	100%	5 10 15 25		SP	Fine to medium SAND, volcanic, black (N2.5/0).
31–32						ML	Silt lens.
32–33	SO0086	15.2	100%	15 15 15 20		SP	Fine to medium SAND, volcanic, black (N2.5/0), wet, wood fragments.
33–34							
34–35	SO0087	23	100%	12 15 17 30			As above, w/ basalt gravel.
35–36							
36–37	SO0088	0	100%	8 12 8 12		GW	Sandy GRAVEL, (basalt clasts) fine to coarse, black (N2.5/0), wet.
37–38						ML	SILT, olive brown (2.5Y 4/3), moist, stiff, slightly plastic.
38–39	SO0089	0	100%	18 15			
39–40							Color change to olive brown (2.5Y 4/4).

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 30 November - 3 December 1998

Well Casing Elevation: 34.50'

Ground Surface Elevation: 34.70'

Hole Size: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

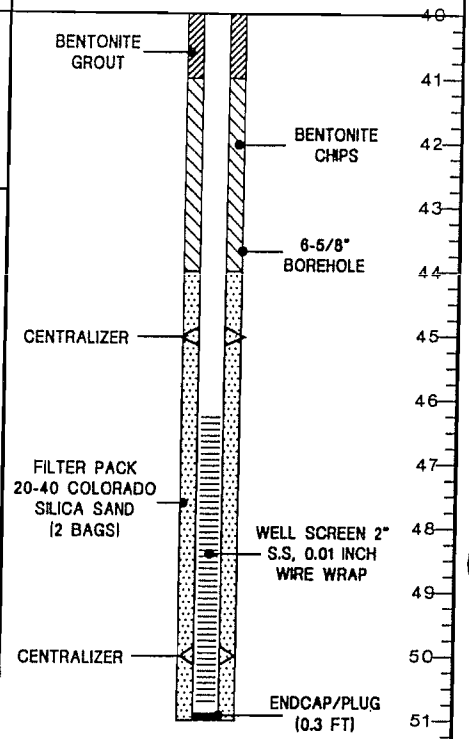
Monitoring Well: MWA-11i

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41	SO0089	0	15%			ML	Clayey SILT, olive brown (2.5 Y 4/4), moist.
41–42	SO0090	0	100%	4 4 4 4			
42–43						ML/SM	Fine, sandy, micaceous SILT, olive brown (5 Y 5/3), wet, soft.
43–44	SO0091	0	100%	6 6 12 20			
44–45							
45–46	SO0092	0	100%	4 7 10 12			
46–47							
47–48	SO0093	0	100%	5 10 15 20			
48–49							
49–50							
50–51	SO0094	0	100%	11 12 15 20		ML	SILT, dark green-gray (5G 3/1), moist, stiff.
51–52						ML/SM	Fine, sandy, micaceous SILT, olive brown (5 Y 5/3), wet, soft.
52–53							Total depth 51.0' bgs
53–54							
54–55							
55–56							
56–57							
57–58							
58–59							
59–60							

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 30 November - 3 December 1998

Well Casing Elevation: 34.50'

Ground Surface Elevation: 34.70'

Hole Size: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

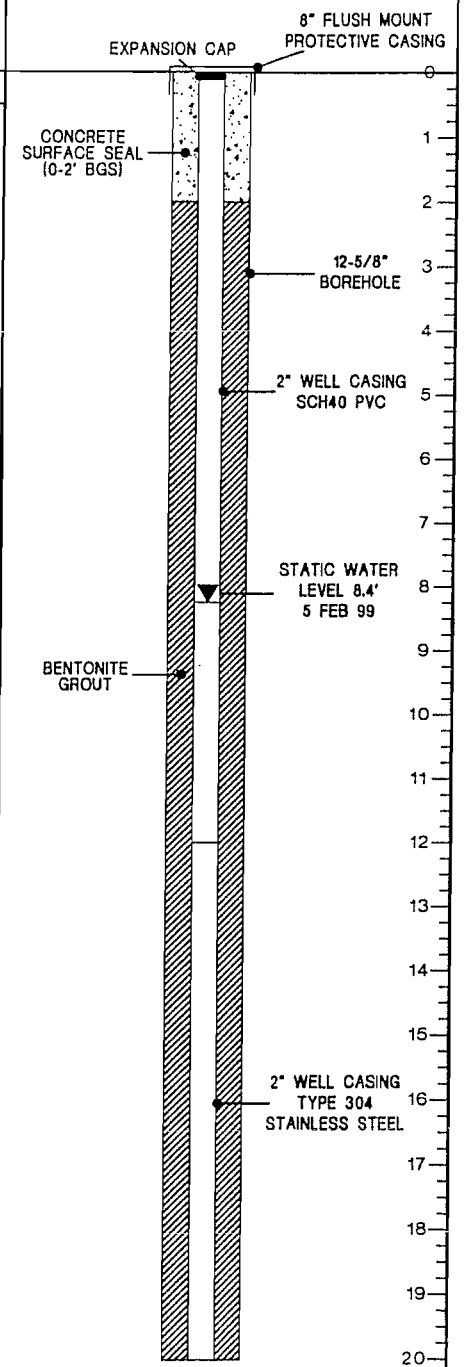
Monitoring Well: MWA-12i

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GW	Gravel (Fill).
5–7	SO0001	0	25%	5 5 2 2	X	SP	Slightly silty SAND, fine to medium, dark gray-brown (10YR4/2), moist.
10–12	SO0002	0	50%	6 8 5 5	X		As above, w/ trace (5%) basalt gravel.
13							Color change in cuttings.
15–17	SO0003	0	50%	4 5 7 9	X	SP	Fine SAND w/ trace silt ~ 2%, black (N2.5/0), moist.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 4 January 1999

Well Casing Elevation: 33.91'

Ground Surface Elevation: 34.22'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

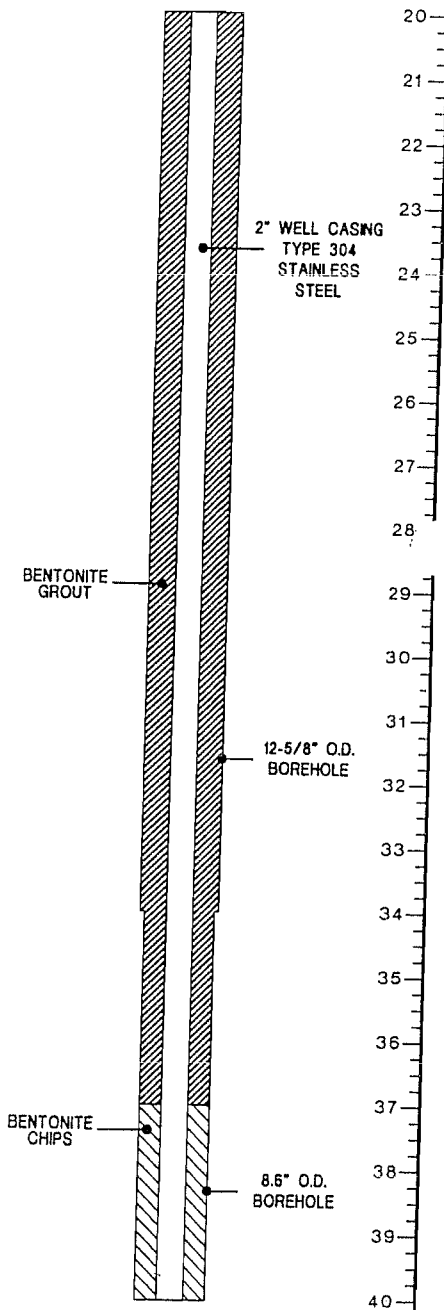
Monitoring Well: MWA-12i

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–22	SO0004	0	75%	5 5 15 25		SP/SM	Fine SAND w/ trace silt (~2%) and intermittent organic silt lenses, black (N2.5/0) wet.
22–23						ML	silt lens
23–24	SO0005	0	100%	11 10 15 18		SP	Fine SAND w/ trace silt, black (N2.5/0) wet.
24–25	SO0006	0	100%	5 8 12 14		SM	Silty fine SAND very dark gray-brown (10YR3/2), wet, stiff.
25–28						SP	Fine SAND w/ trace silt (~2%), black (N2.5/0) wet.
26–27	SO0007	0	100%	7 7 8 12			
28–29	SO0008	0	100%	7 9 9 12		ML	SILT, black (5Y,2.5/1) moist, stiff
29–30						SM	Silty fine SAND, black (N2.5/0) wet
30–31	SO0009	0	100%	9 9 12 16			
31–33	SO0110	0	100%	4 6 6 7		ML	SILT w/ angular, chert gravel (<1/4"), very dark gray (5Y,3/1) moist, stiff
33–35	SO0111	0	100%	10 12 12 17		SM	Silty fine SAND, black (N2.5/0), wet.
35–37	SO0112	0	100%	4 4 4 6		ML	SILT w/ trace organic material, very dark gray (5Y 3/1), moist, stiff.
37–38						SP	Silty fine SAND lens, black (N2.5/0).
38–40	SO0113	0	100%	10 8		ML	SILT w/ trace organic material, very dark gray (5Y 3/1), moist, stiff.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 4 January 1999

Well Casing Elevation: 33.91'

Ground Surface Elevation: 34.22'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

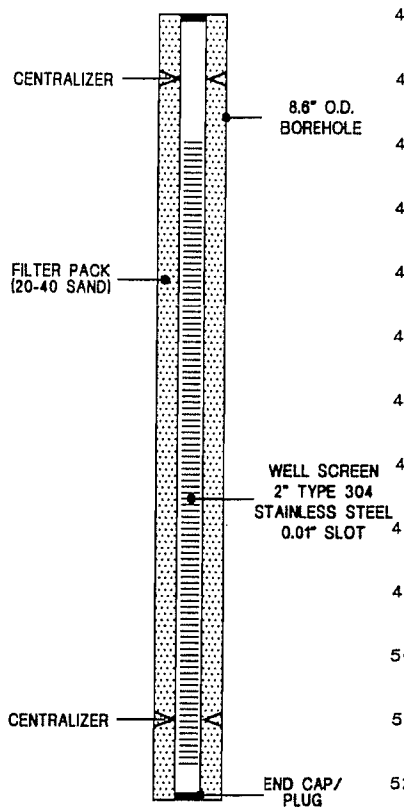
Monitoring Well: MWA-12i

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41	SO0014	0	100%	4 5 7 11		ML/CL	Clayey SILT to silty clay w/ trace organics (2%), very dark gray (5Y 3/1), moist, stiff.
41–42						ML	SILT, very dark gray (5Y, 3/1) moist, stiff.
42–43	SO0015	0	100%	3 4 8 12			
43–44							
44–45	SO0016	0	100%	3 3 7 7			
45–46							Color change to very dark, gray brown (2.5Y 3/2).
46–47	SO0017	0	100%	3 4 5 7		CL/ML	Silty CLAY, dark green-gray (5G Y3/1), abundant root fragments, moderately plastic, stiff, wet.
47–48							
48–49	SO0018	0	100%	6 8 10 12			Color change to dark green-gray (5G Y4/1).
49–50							
50–51	SO0019	0	100%	4 6 11 13			Silty fine sand lens (~1/8"), very dark gray (5Y3/1) at 50.25'. Clayey SILT, olive brown w/ rust red mottling (2.5Y, 4/3), moist, slightly plastic.
51–52							Total depth @ 52' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 4 January 1999

Well Casing Elevation: 33.91'

Ground Surface Elevation: 34.22'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

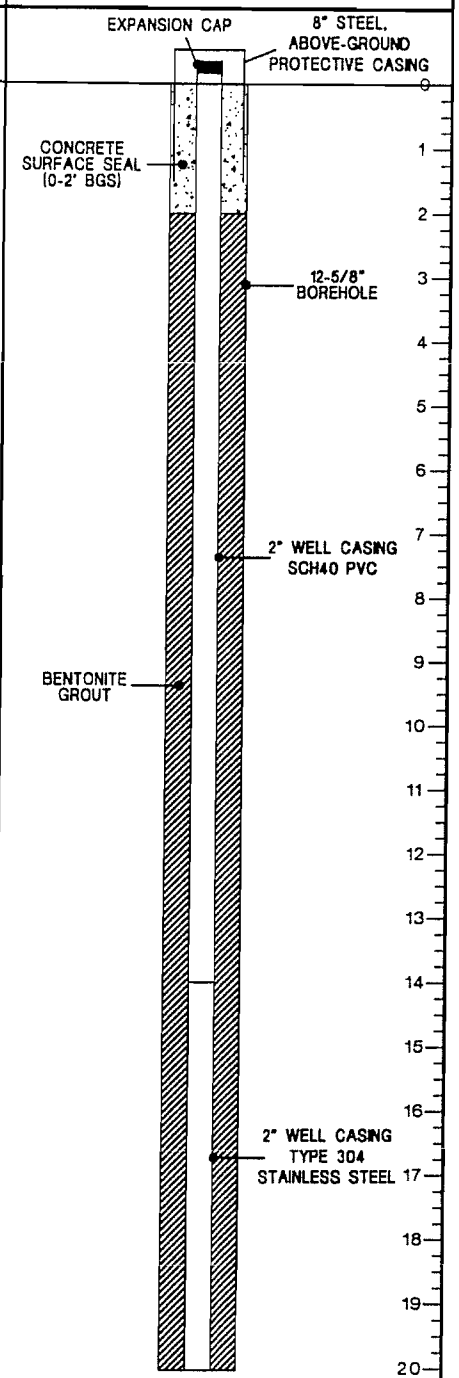
Monitoring Well: MWA-13d

Ground surface: Native vegetation

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0–5							
5–7	SO0113	0	10%	5 5 3 3	X	ML/ GM	Sandy, gravelly, clayey, SILT brown (7.5 YR 4/3) (Fill).
7–10							
10–12	SO0114	0	10%	3 2 1 1	X	GM	Grading to silty, sandy, GRAVEL (Fill).
12–15							
15–17	SO0115	0	5%	11 12 12 17	X	GM	As above, coarse gravel (>3").
17–20							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 4 - 6 January 1999

Well Casing Elevation: 37.06'

Ground Surface Elevation: 34.750'

Hole Size: See construction detail

Datum: City of Portland Datum

Sheet: 1 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

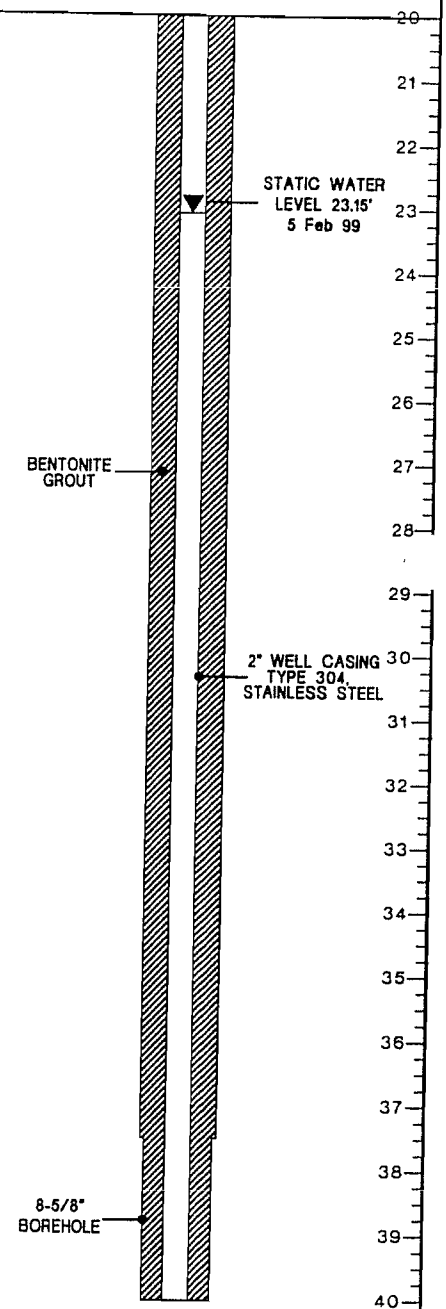
Monitoring Well: MWA-13d

Ground surface: Native vegetation

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–22	SO0116	0	20%	8 12 8 12		ML/GM	Silty, sandy GRAVEL, brown (7.5YR 4/3).
23–27	SO0117	0	25%	25 33 40 50/1"		SP	Fine to medium SAND, trace silt (~2-5%), dark gray (2.5 Y 4/1).
28–30							
31	SO0118	2.2	80%	4 5 12 12		ML	SILT, dark gray brown (10 YR 3/2).
32						SP	Fine to medium SAND, very dark gray (10 YR 3/1).
33	SO0119	70	80%	5 13 22 30		SM	Fine to medium SAND with abundant pale yellow (5Y 8/2) silt nodules, moderate odor.
34							Silt lens at 34'
35	SO0120	306	100%	5 12 12 40			Grading to fine to medium SAND, very dark gray (10 YR 3/1) moderate odor. Silt lens at 35'
36–37	SO0121	677	100%	4 4 7 13			Slight pinkish hue, strong odor, residual NAPL observed at 36.5' to 37'.
37–38		0				ML	SILT, very dark gray (10 YR 3/1), stiff, no odor.
39–40	SO0123	112		3 5 9 15		SP	Fine to medium SAND, black (N 2.5/0) volcanic with native organic material (~ 20%) wet.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 4 - 6 January 1999

Well Casing Elevation: 37.06'

Ground Surface Elevation: 34.750'

Hole Size: See construction detail

Datum: City of Portland Datum

Sheet: 2 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

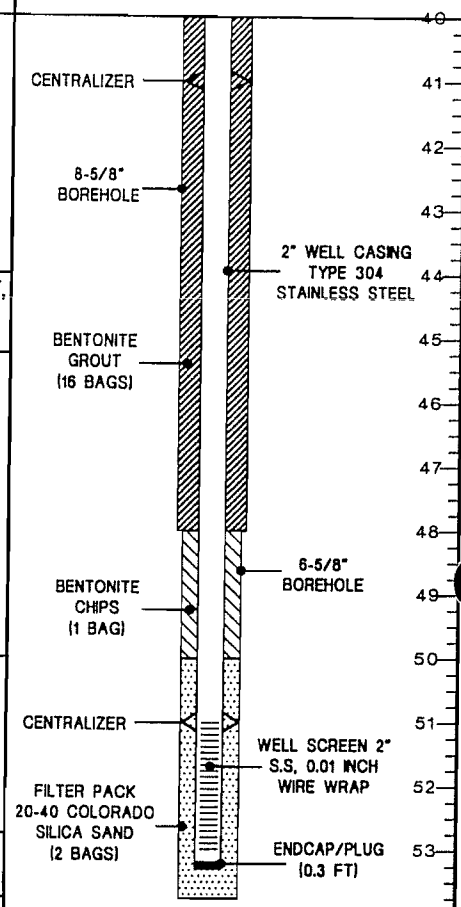
Monitoring Well: MWA-13d

Ground surface: Native vegetation

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–43						SP	Fine to medium SAND, black (N2.5/0), volcanic, with native organic material.
43–44	SO0124	106	100%	7 6 8 12			As above, no organic material.
44–45	SO0124	32.8	100%	7 6 8 12		SM/ ML	Silty, fine SAND, grading to fine sandy, SILT, dark-brown (2.5Y 4/2) wet.
45–46						ML	SILT, dark, gray-brown (2.5Y 4/2) wet.
46–47	SO0125	15.1	100%	3 8 12 16			
47–48	SO0125	15.1	100%	3 8 12 16			
48–49	SO0126	NM	100%	NA			
49–50	SO0126	NM	100%	NA			
50–51	SO0127	0	80%	10 12 12 15		ML/ SM	Fine, sandy SILT dark gray-brown (2.5 4/2) w/ rust red mottling, wet, grading to slightly silty, very fine SAND.
51–52	SO0127	0	80%	10 12 12 15			
52–53	SO0128			15 50/4"			
53						RX	Basalt, black
54							Total depth 53.8'

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 4 - 6 January 1999

Well Casing Elevation: 37.06'

Ground Surface Elevation: 34.750'

Hole Size: See construction detail

Datum: City of Portland Datum

Sheet: 3 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

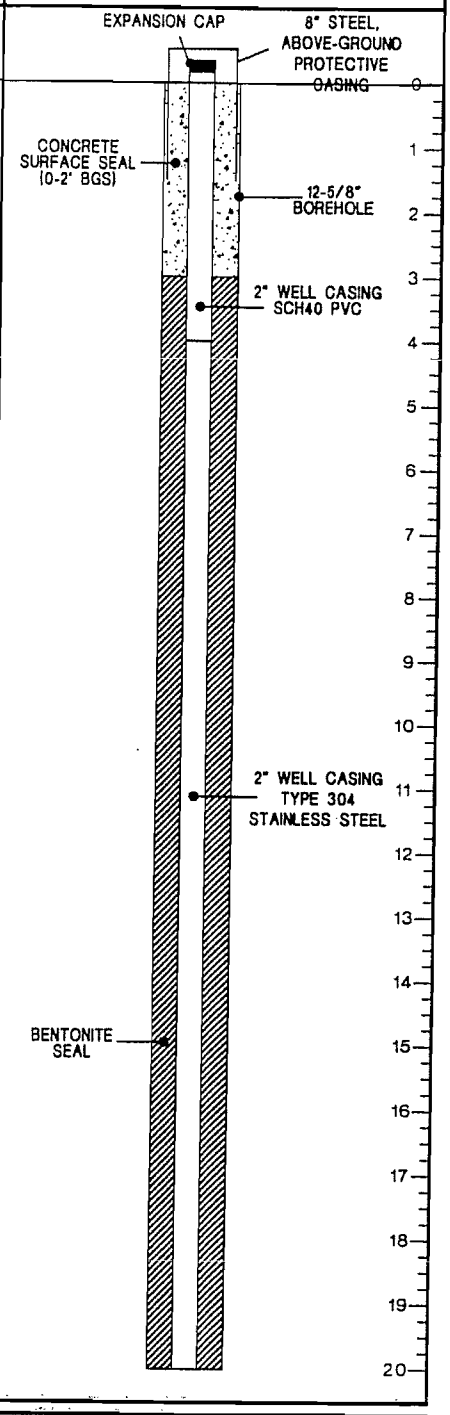
Monitoring Well: MWA-14i

Ground surface: Native vegetation

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0–4							Cuttings indicate fine to medium SAND w/ trace silt
5–7	SO0095	0	50%	4 5 7 9	X	SW	Fine to coarse SAND, trace silt (~ 2-5%), very dark gray-brown (10YR 3/2), moist, no odor, (fill).
10–12	SO0096	0	100%	5 10 12 14	X		
15–17	SO0097	0	50%	7 15 50 for 4"	X		

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 15-17 December 1998

Well Casing Elevation: 37.39'

Ground Surface Elevation: 35.01'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

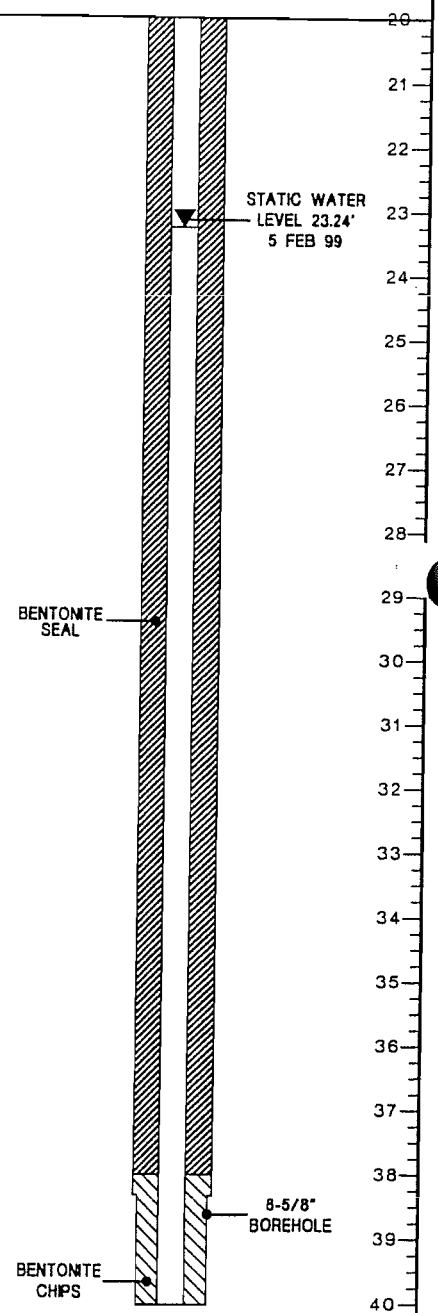
Monitoring Well: MWA-14i

Ground surface: Native vegetation

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–22	SO0098	0	100%	4 8 20 50/3"		SW	Fine to coarse SAND w/ trace silt, very dark gray-brown (10YR 3/2), moist, no odor, (fill).
22–24	SO0099	0	100%	3 5 7 9			
24–26	SO0100	0	80%	3 9 12 24			
26–28	SO0101	0	100%	3 5 8 15			
28–30	SO0102	0	100%	5 10 23 50			Sample showing laminar structure w/ trace wood fragments.
30–32	SO0103	0	100%	5 4 18 25			As above with trace root fragments.
32–34	SO0104	0	100%	12 15 28 40		SP	Fine to medium SAND, volcanic, black (2.5N/0), wet.
34–36	SO0105	0	50%	10 12 17 20			As above, w/ trace wood fragments.
36–38	SO0106	0	100%	18 22 24 25			As above, no wood fragments.
38–40	SO0107	0	100%	7 12 14 20		ML	SILT, very dark gray (5Y, 3/1).
							Fine to medium SAND, volcanic, black (2.5N /0) wet.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 15-17 December 1998

Well Casing Elevation: 37.39'

Ground Surface Elevation: 35.01'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.001.0623

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

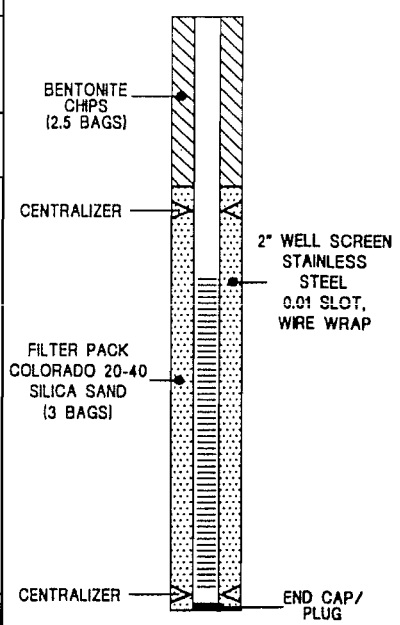
Monitoring Well: MWA-14i

Ground surface: Native vegetation

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41	SO0108	0	100%	10 12 13 16		SP	Fine to medium SAND, volcanic, black (2.5N/0).
41–42						ML	SILT, dark green-gray (5G, 3/1), moist.
42–44	SO0109	0	100%			SM	Silty, fine, micaceous SAND, dark green-gray (5GY, 4/1) wet
44–46	SO0110	0	100%	3 3 3 5			
46–48	SO0111	0	100%	2 2 4 10		ML	SILT, dark gray-brown (2.5Y, 4/2) w/ rust red mottling, moist.
48–49	SO0112	0	100%	3 2 50 for 3"		SM	Very fine, silty SAND, dark gray-brown (2.5Y4/2) wet
49							Basalt, vesicular basalt fragments.
							Total depth @ 49.25' BGS

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 15-17 December 1998

Well Casing Elevation: 37.39'

Ground Surface Elevation: 35.01'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

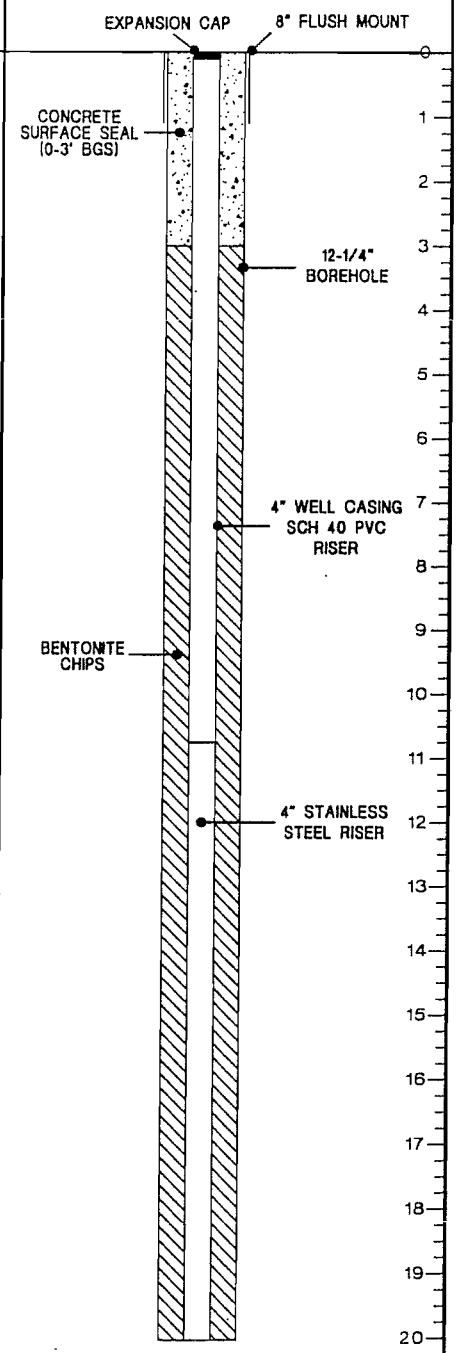
Monitoring well: MWA-15

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
5–6	SO0355	232	10%	8 12 5	X	SW	Fine to medium SAND w/ trace silt and well rounded gravel < 2", dark grey-brown (10YR 4/2), w/ black staining, moist (fill)
10–11	SO0356	95	20%	15 20 25	X		as above w/ slight pink hue
15–16	SO0357	3.5	80%	20 50 for 6"	X		as above w/ trace fine to coarse gravel > 1", light red-grey (2.5YR 7/1), moist

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 5 August 1999

Well Casing Elevation: 34.01'

Ground Surface Elevation: 34.26'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

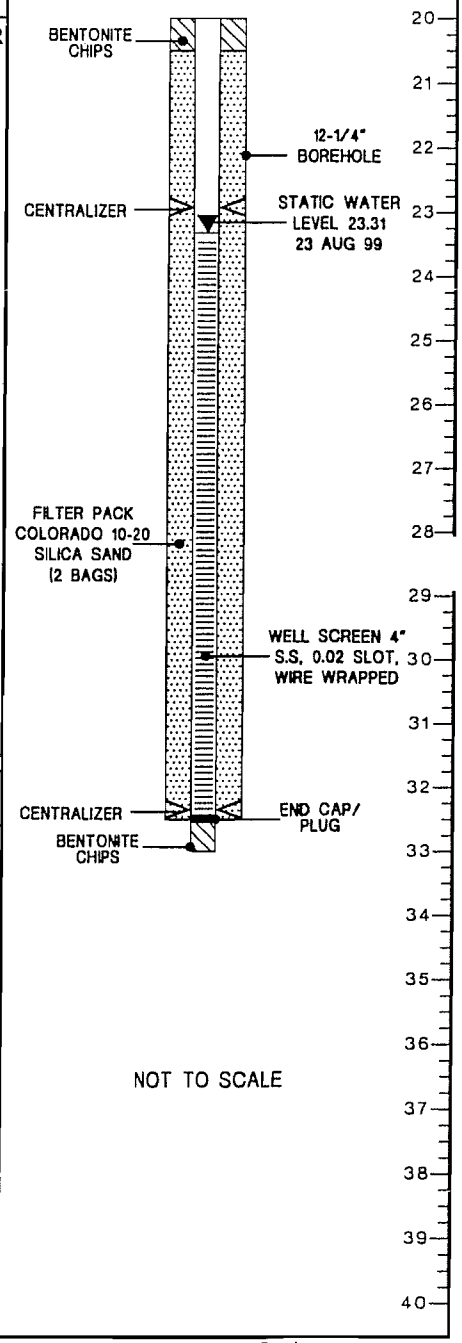
Monitoring well: MWA-15

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
SO0358	5.3	100%	27 50 for 6"		SW	Fine to medium SAND, dark red-grey (2.5YR 4/1) to reddish grey (2.5YR 6/1)
SO0359	8.8	80%	21 50 for 6"			As above, reddish-gray (2.5YR 6/1), wet
SO0360	23	100%	30 50 for 6"			
SO0361	10.6	100%	8 22 30			
SO0362	>2400	100%	30 50 for 6"			residual NAPL observed from 26' to 31.5'
SO0363	>2400	100%	30 50 for 4"			
SO0364	>2400	100%	40 50 for 6"			
SO0365	>2400	100%	40 50 for 6"			
SO0366	>1068	100%	40 50 for 6"		SM	fine to medium SAND w/ pale yellow silt (2.5Y 8/3)
SO0367	>1038	100%			ML	SILT, dark grey-brown (2.5Y 4/2), moist
						Total depth 33.0' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 5 August 1999

Well Casing Elevation: 34.01'

Ground Surface Elevation: 34.26'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

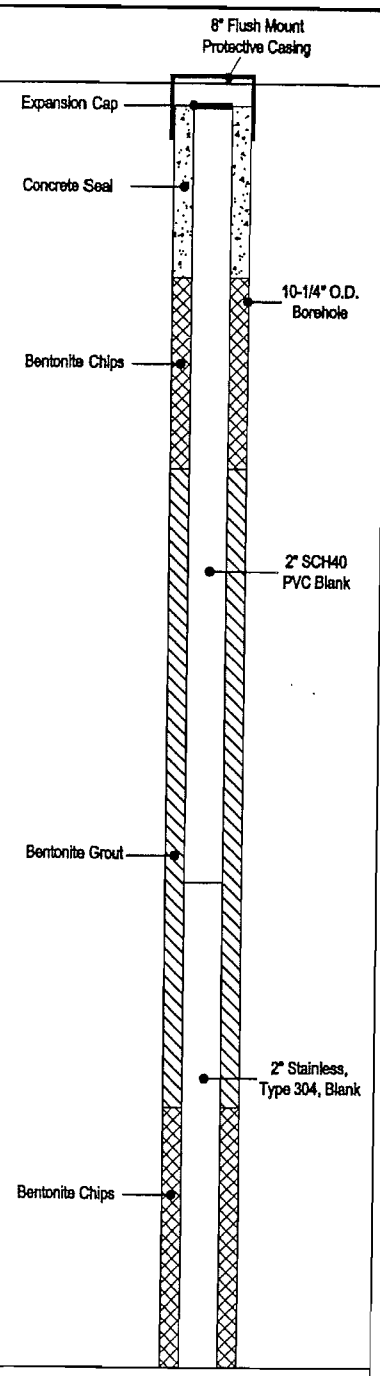
Boring Number: MWA-15r

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0–12							GP	GRAVEL, 3/4" minus crushed rock (fill).
12–20	SO1031	0.0	NA	100%	17 23 50 for 5"	X	SP	Fine to medium SAND. Pinkish white (2.5Y 8/2) slighlty moist, slight odor.

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 07 Feb 2001

Well Casing Elevation: 34.11'

Ground Surface Elevation: 34.40'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland

Sheet: 1 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

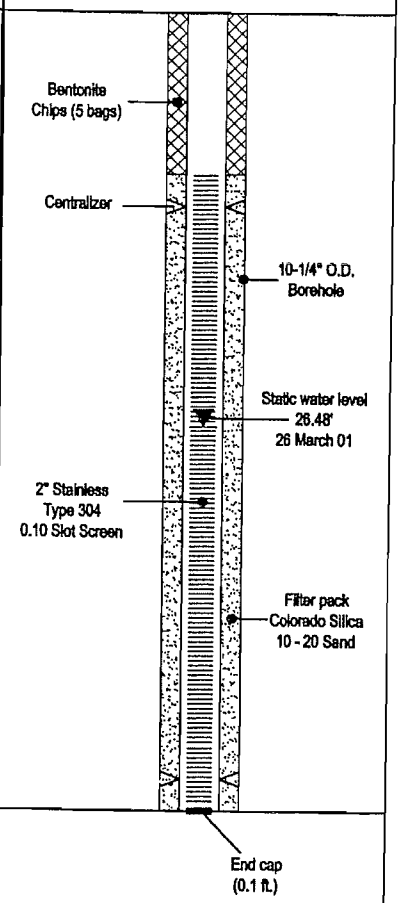
Boring Number: MWA-15r

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO1032	0.0	NA	100%	18 28 40	X	SP	Fine to medium SAND, pinkish white (2.5Y 8/2) slightly moist, slight odor.
25–26	SO1033	230	NA	100%	20 50-6"	X		
26–27	SO1034	>6000	NA	100%	13 30 50-5"	X		As above, wet, strong odor, residual NAPL observed @ 26.5' to 32.5'.
28–29	SO1035	>10,000	NA	100%	18 50-6"	X		
29–30	SO1036	>4000	NA	100%	8 18 50-6"	X		
31–32	SO1037	5200	NA	100%	20 50-6"	X		
33								Total depth @ 32.5.

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 07 Feb 2001

Well Casing Elevation: 34.11'

Ground Surface Elevation: 34.40'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland

Sheet: 2 of 2

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

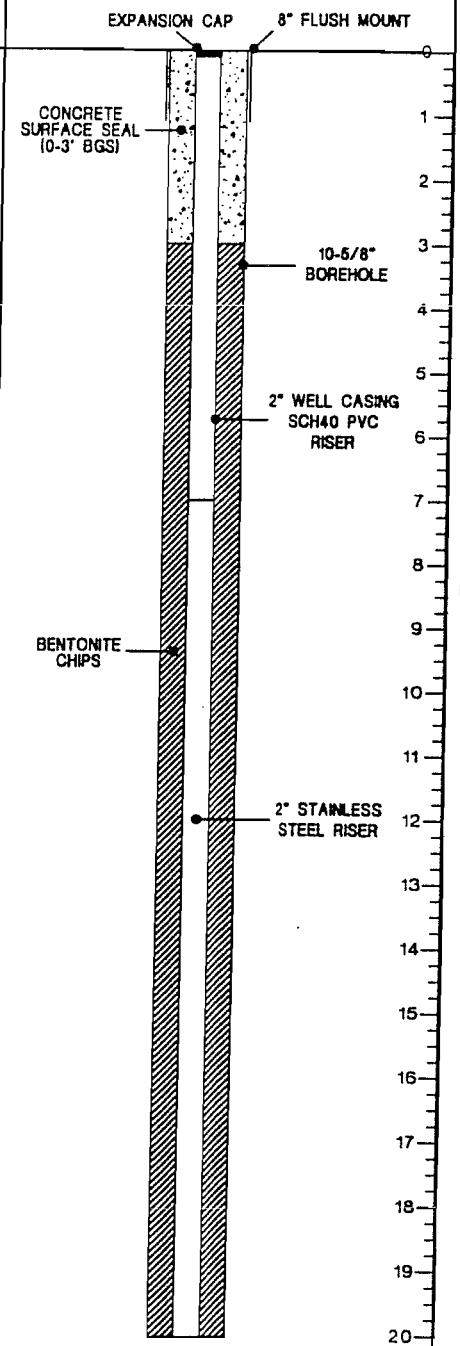
Monitoring well: MWA-16i

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
5–6	SO0378	3.8	60%	4 4 3 6	X	SW	Fine to coarse SAND, dark grey-brown (10YR 3/1), slighty moist (fill)
10–11		3.8	0%		X		No recovery, cuttings indicate fine to coarse SAND
15–16	SO0379	1.9	100%	3 5 5 7	X	ML	Slightly clayey SILT w/ trace very fine sand and trace construction debris (slag, brick, wire), dark grey (2.5YR 4/2) w/ rust red mottling, moist (fill)

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump and Drilling

Drill Method: Cable Tool

Drill Date: 12 August 1999

Well Casing Elevation: 34.82'

Ground Surface Elevation: 35.10'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

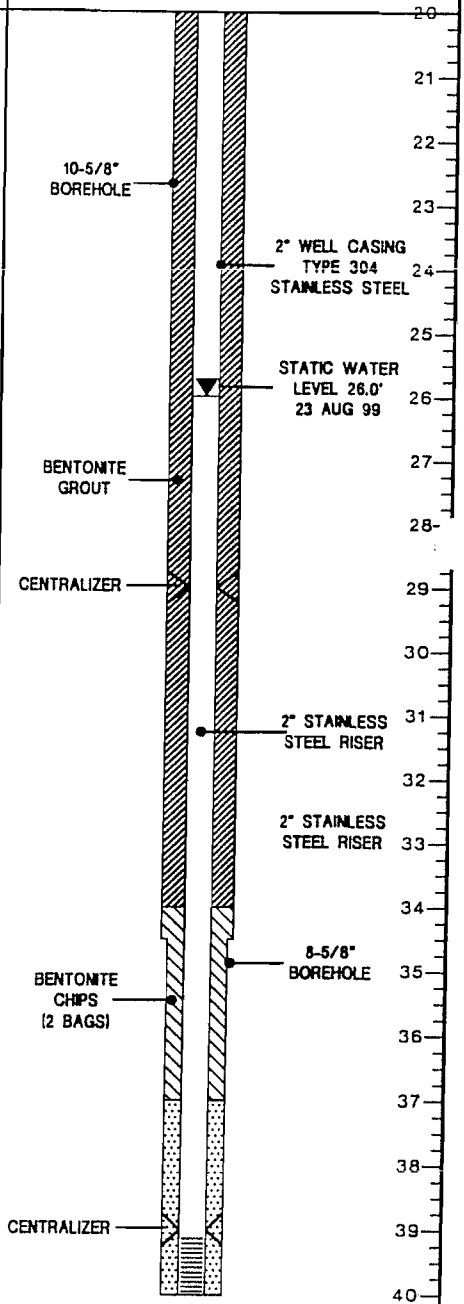
Location: Portland, OR

Monitoring Well: MWA-16i

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–22	SO0380	1.9	25%	70/ 50-1"		SW	Fine to coarse SAND w/ basalt cobbles (<2"), dark grey-brown (10YR 4/2), wet
22–25							Cuttings indicate material grading coarse w/ depth Difficult drilling, possible large rocks
25–26	SO0381	3.8	80%	10 15 15 3		ML	SILT w/ carbonized organics, greenish black (5GY 2.5/1)
26–27						SP	Fine to medium SAND, very dark grey-brown (2.5Y 3/2), wet
27–29	SO0382	3.8	80%	22 22 23 28			
29–31	SO0383	3.8	100%	12 12 17 22			SILT lens SILT lens
31–33	SO0384	1.9	100%	10 10 15 18		ML	SILT, dark grey-brown (2.5Y 4/2)
						SP	Fine to medium SAND, very dark grey-brown (2.5Y 4/2), wet
33–35	SO0385	1.9	100%	12 12 18 20		ML	SILT, dark grey-brown (2.5Y 4/2)
						SP	Fine to medium SAND, very dark grey-brown (10YR 2/2)
35–37	SO0386	3.6	100%	15 25 25 30		ML	SILT w/ carbonized organics, very dark grey-brown (2.5Y 3/2)
						SP	
37–38	SO0387	3.6	100%	7 10 20 22		ML	Fine to medium SAND, black (10Y 3/1)
						SP	SILT w/ carbonized organics, black (5Y 2.5/1)
38–40	SO0388	1.8	100%	9 12 14 15			Fine to medium SAND, very dark grey-brown (10YR 3/2), wet



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 12 August 1999

Well Casing Elevation: 34.82'

Ground Surface Elevation: 35.10'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

Monitoring Well: MWA-16i

Ground surface: Asphalt

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40							
	(See page 2)					SP	Fine top medium SAND, very dark grey-brown (10YR 3/2), wet
41							
42	SO0389	1.8	15%	7 5 7 10			
43							
44	SO0390	1.8	100%	5 10 17 20		ML/SM	Very fine micaceous sand SILT, dark grey (2.5Y 4/2)
45							
46	SO0391	1.8	100%	5 7 16 19			
47							Total depth 47.0' bgs
48							
49							
50							
51							
52							
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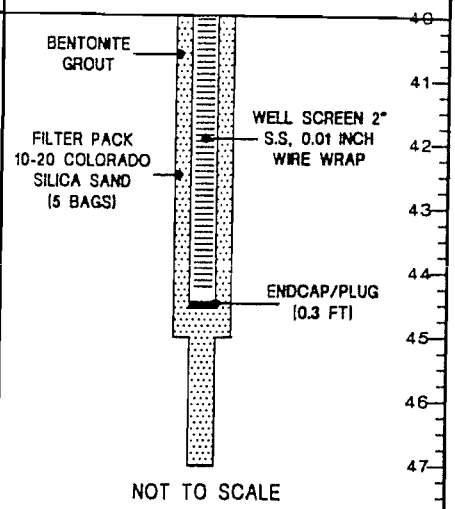
54							
55							
56							
57							
58							
59							
60							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 12 August 1999

Well Casing Elevation: 34.82'

Ground Surface Elevation: 35.10'

Borehole diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

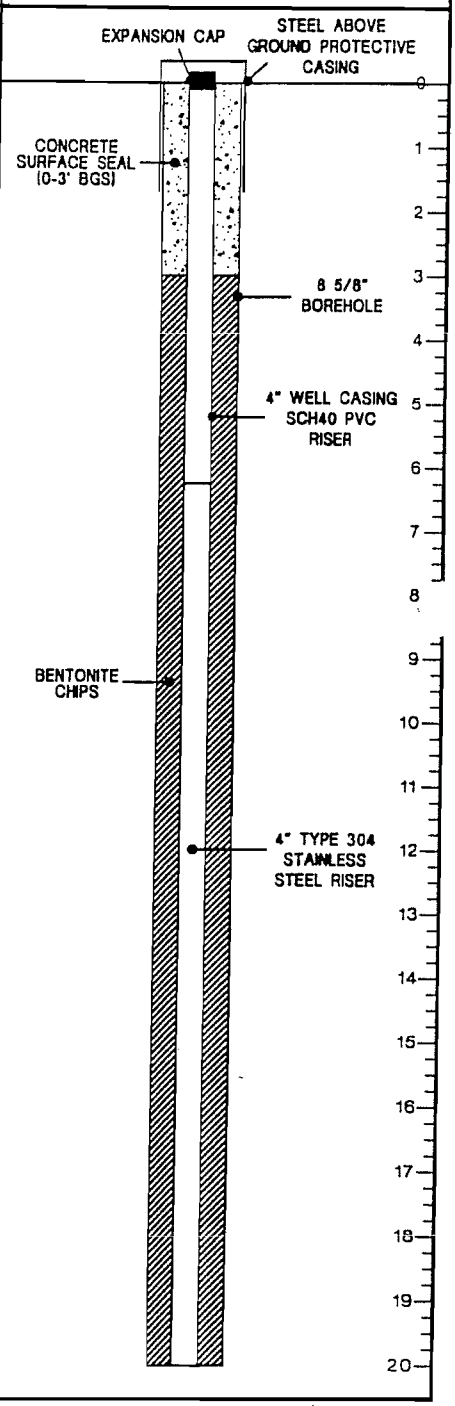
Monitoring well: MWA-17si

Ground surface: Native grass and weeds

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
5–7	SO0369	0	10%	2 3 5 8	X	ML/GM	Sandy, gravelly, clayey SILT, brown (7.5YR 4/3) (fill)
10–12	SO0370	0	10%	5 7 7 8	X		
15–17	—	0	0%		X		No recovery

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump and Drilling

Drill Method: Cable Tool

Drill Date: 12 August 1999

Well Casing Elevation: 37.20'

Ground Surface Elevation: 34.40'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.001.0723

Project: Acid Plant RI

Client: Elf Atochem

Location: Portland, OR

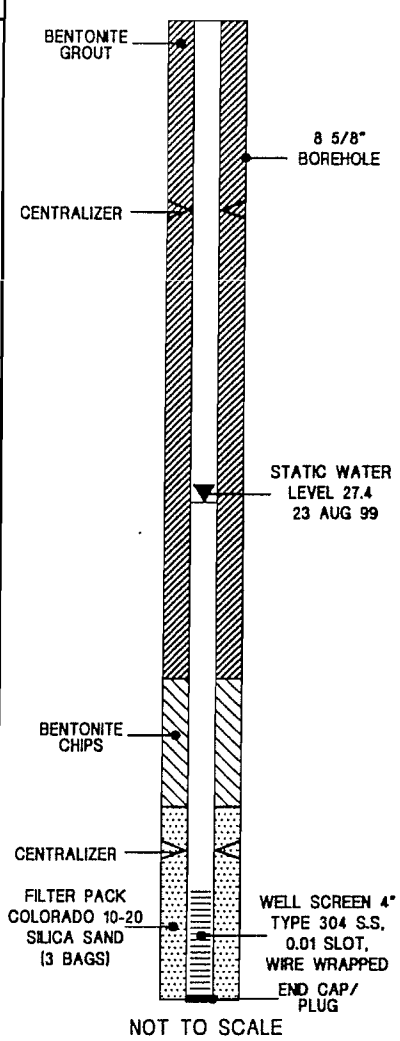
Monitoring well: MWA-17si

Ground surface: Native grass and weeds

Geologist: Jeffrey S. Paul

	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–25			0%				No recovery
26–27	SO0373	0	100%	7 14 17 22		SP	Fine to medium SAND, trace silt (~2-5%) and construction debris (metal wire), dark grey (2.5Y 4/1), wet
28–29	SO0374	0	100%	7 12 15 18			
30–31	SO0375	3	100%	5 8 10 12			
31						ML	SILT w/ carbonized organics ~ 1/4" thick
31–32						SP	Fine to medium SAND, trace silt (~2-5%), dark grey (2.5Y 4/1), wet
32–33	SO0376	45	100%	5 5 14 17		ML/SM	Very fine, sandy SILT w/ wood debris, dark grey (10YR 3/2), wet
33–34						SP	Fine to medium SAND, very dark grey-brown (10YR 3/2), wet
34						ML	SILT, very dark grey-brown (10YR 3/2)
34–35	SO0377	>3884	100%	5 9 12 17		SP	Fine to medium SAND, very dark grey-brown (10YR 3/2), wet
35						ML	Residual NAPL observed @ 34.75 to 35.05'
35–36							SILT, very dark grey-brown (10YR 3/2)
36–40							Total depth 35.3' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump and Drilling

Drill Method: Cable Tool

Drill Date: 12 August 1999

Well Casing Elevation: 37.20'

Ground Surface Elevation: 34.40'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

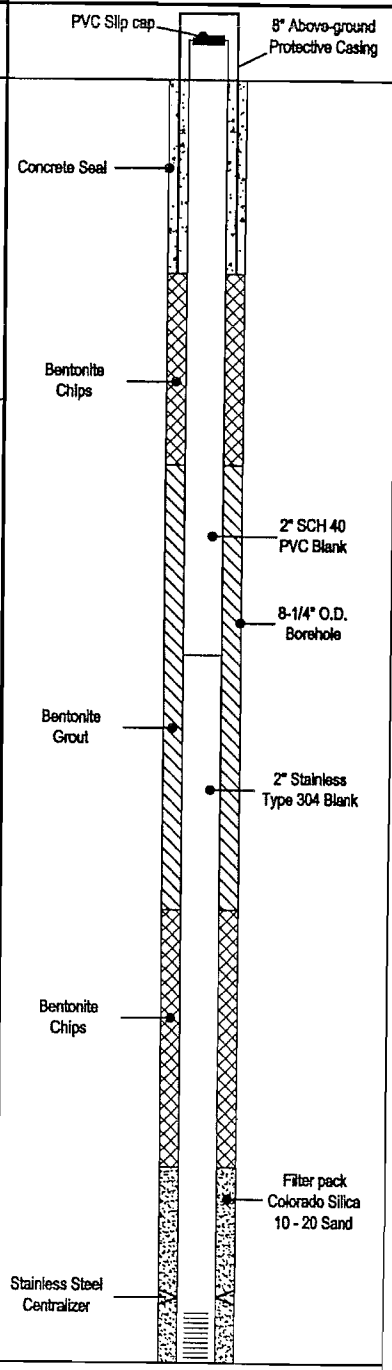
Boring Number: MWA-18

Ground surface: Grass

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
5–6	SO1010	0.0	NA	25%	50-6"		SM	Silty fine to medium SAND with abundant construction debris (concrete-brick), gray-brown (2.5Y 4/2), moist, difficult drilling (fill).
10–11	SO1011	0.0	NA	100%	8 10 16		SP	Fine to medium SAND w/ some large gravel (up to 2" dia.), brown (10Y 4/3), moist (fill).
15–16	SO1012	0.0	NA	60%	11 50-6"		ML	SILT w/ trace rounded gravel (quartz), brown (10Y 4/3), moist (fill).

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 06 Feb 2001

Well Casing Elevation: 37.49'

Ground Surface Elevation: 34.80'

Borehole Diameter: 8-1/4" O.D.

Datum: City of Portland

Sheet: 1 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

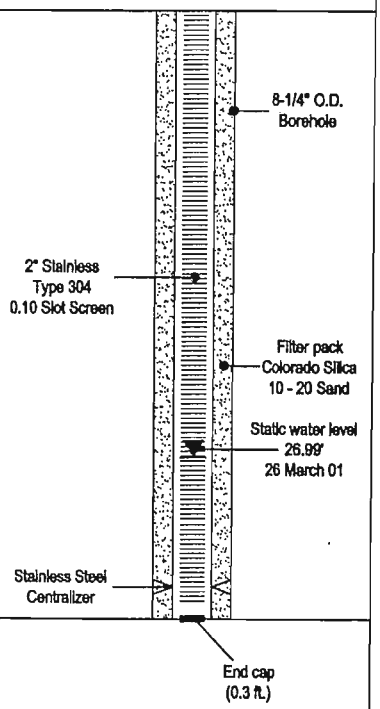
Boring Number: MWA-18

Ground surface: Grass

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	NA	NA	NA	0%	NA			No recovery, driller indicates abundant concrete debris (fill).
25–26	SO1013	0.0	NA	100%	50 for 6"		SP	Fine to medium SAND, brown (10YR 4/3), moist w/ rust red mottling.
26							ML	SILT, dark gray w/ trace sand lens.
27	SO1014	0.0	NA	100%	40 45 33		SP	Fine to medium SAND, brown (10YR 4/3), wet.
28–29	SO1015	0.0	NA	100%	26 32 35			SILT lens.
29							ML	SILT, brown (10YR 4/3), wet.
30–40								Total depth 29.5' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 06 Feb 2001

Well Casing Elevation: 37.49'

Ground Surface Elevation: 34.80'

Borehole Diameter: 8-1/4" O.D.

Datum: City of Portland

Sheet: 2 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

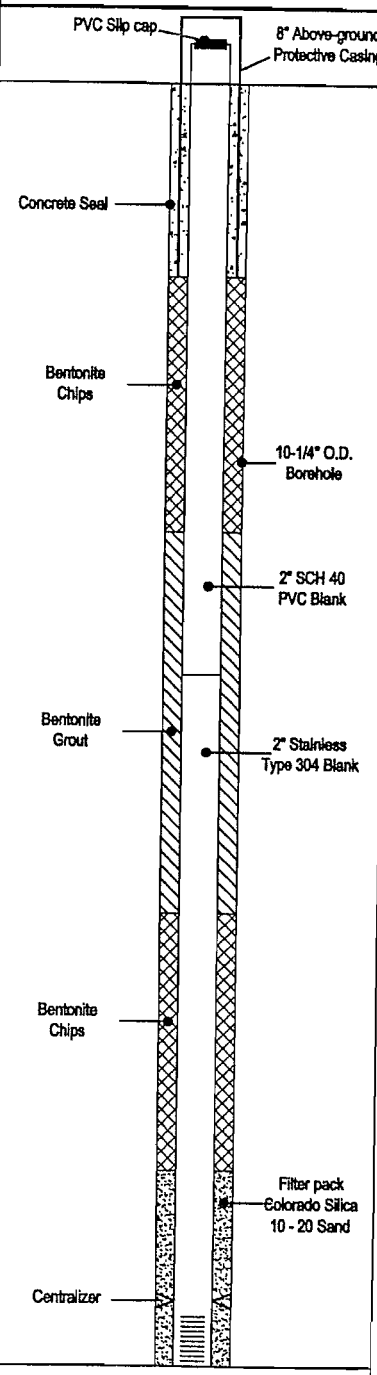
Location: Portland, OR

Boring Number: MWA-19

Ground surface: Grass

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
5–6	NA	NA	NA	0%	50 for 4"			No recovery, construction debris (concrete), very difficult drilling (fill).
10–11	SO1001	0.0	NA	40%	6 26 32		ML/GM	Gravelly, sandy SILT w/ abundant construction debris (concrete), brown (10YR 4/3), moist to wet (fill).
15–16	SO1002	0.0	NA	~10%	16 18 20			



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 06 Feb 2001

Well Casing Elevation: 38.00'

Ground Surface Elevation: 35.70'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland

Sheet: 1 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

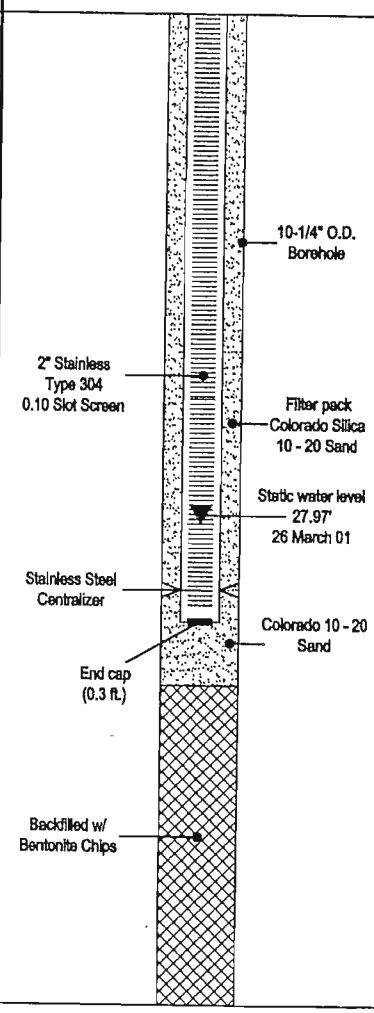
Boring Number: MWA-19

Ground surface: Grass

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO1003	0.0	NA	100%	8 18 22		SP	Fine to medium SAND, brown (10YR 4/3), moist to wet (fill).
21–25							SM/ML	Silty SAND to sandy SILT w/ trace fine gravel, brown (10YR 4/3), moist to wet (fill).
25–26	NA	NA	NA	0%	50 for 4"			No recovery (concrete debris).
26–27	SO1004	0.0	NA	100%	8 20 22		SP	Fine to medium SAND, brown (10YR 4/3) w/ rust red mottling, wet.
28–29	SO1005	0.0	NA	100%	9 12 12			As above w/ SILT lenses ~1/2" thick, gray-brown (2.5Y 4/2), wet.
29–30	SO1006	0.0	NA	100%	10 10 15		ML	SILT, brown (10YR 4/3), wet.
31–32	SO1007	0.0	NA	100%	10 12 16		SP	Fine to medium SAND, brown (10YR 4/3), wet.
33–34	SO1008	0.0	NA	100%	10 10 12			
34–35	SO1009	0.0	NA	100%	8 10 15			
36–40								Total depth 35.5' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 06 Feb 2001

Well Casing Elevation: 38.00'

Ground Surface Elevation: 35.70'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland

Sheet: 2 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

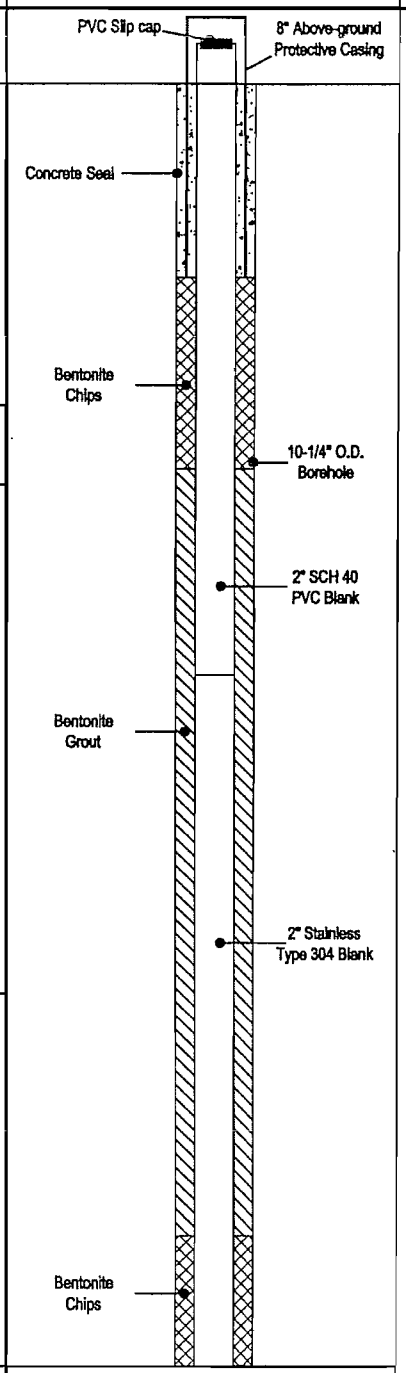
Boring Number: MWA-20

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
5–6	SO1016	0.0	NA	100%	25 50-6"		SP	Fine to medium SAND, brown (10YR 4/3), slightly moist, loose (fill).
6–14							ML	SILT w/ trace coarse rounded quartz gravel, brown (10YR 4/3), moist, stiff.
10–11	SO1017 SO1027	0.0	NA	25%	50-6"			
14–20	SO1018	0.0	NA	50%	25 30 28		SP	Fine to medium SAND w/ large basalt cobble, brown (10YR 4/3), slightly moist, loose.

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 07 Feb 2001

Well Casing Elevation: 39.03'

Ground Surface Elevation: 36.50'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland

Sheet: 1 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

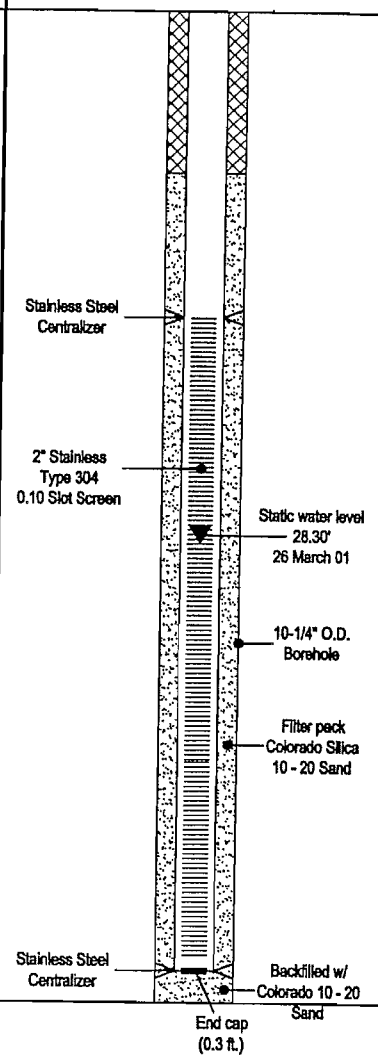
Boring Number: MWA-20

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20								
21	SO1019	0.0	NA	100%	23 50 -6"		SP	Fine to medium SAND, brown (10YR 4/3), slightly moist, loose.
22								
23								
24								
25								
26	SO1020	0.0	NA	100%	35 50 -6"			
27	SO1021	0.0	NA	100%	18 28 38			As above, wet.
28								
29	SO1022	0.0	NA	100%	25 38 48			
30	SO1023	0.0	NA	100%	13 30 50-5"			
31								
32	SO1024	0.0	NA	100%	25 50 -6"			
33	SO1025	0.0	NA	100%	25 50 -6"			
34								
35	SO1026	0.0	NA	100%	50 -6"			
36								Total depth 35.5' BGS
37								
38								
39								
40								

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 07 Feb 2001

Well Casing Elevation: 38.00'

Ground Surface Elevation: 35.70'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland

Sheet: 2 of 2

Project No: 8601192.001.0726

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

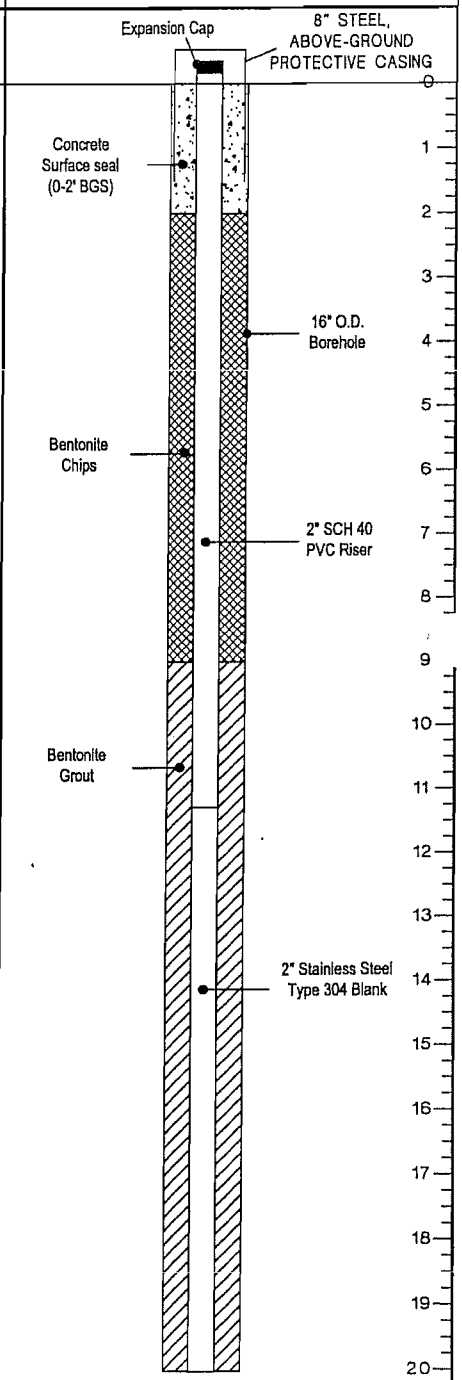
Boring Number: MWA-21b

Ground surface: Natural plants/grass

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0–1.5		0	35%	60 50-3"	X	ML/ GM	Sandy gravelly SILT to silty GRAVEL, brown (10YR4/3), moist, (fill).

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 2 - 19 October 2001

Well Casing Elevation: 36.84'

Ground Surface Elevation: 34.25'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 4

Project No: 8601192.001.0726

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

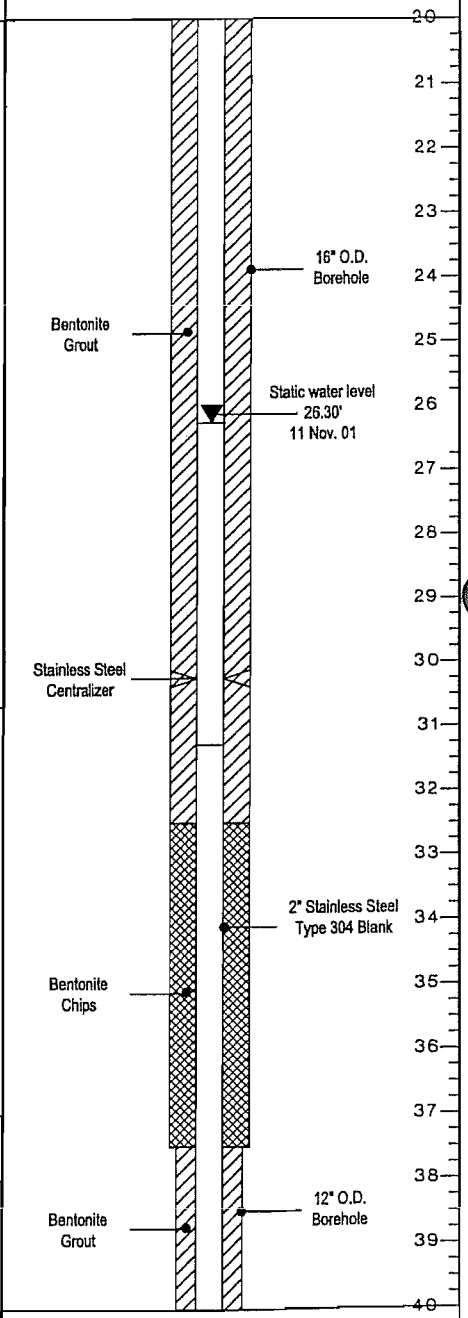
Boring Number: MWA-21b

Ground surface: Natural plants/grass

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–30						ML/GM	Sandy gravelly SILT to silty GRAVEL, brown (10YR4/3), moist, (fill).
30–31			80%	15 15 27		SM	Silty SAND (silt:15%, sand: fine to medium), light yellow-brown (2.5Y 6/5), indistinct odor.
31–32			80%	12 15 15		SM	
32–33			85%	25 30 20		SM	
33–34			80%	14 18		SM	
34–35			75%	20 25		SM	
35–36			80%	15		SM	
36–37			100%	5		ML	SILT, dark gray-brown (2.5Y 4/2), moist, moderate odor.
37–38			60%	--		SP	Fine to medium SAND, very dark gray (2.5Y 3/1), trace silt, slightly micaceous, wet, weak to moderate odor.
38–39			75%	5 7 8 8		SP	
39–40							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 2 - 19 October 2001

Well Casing Elevation: 36.84'

Ground Surface Elevation: 34.25'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 4

Project No: 8601192.001.0726

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

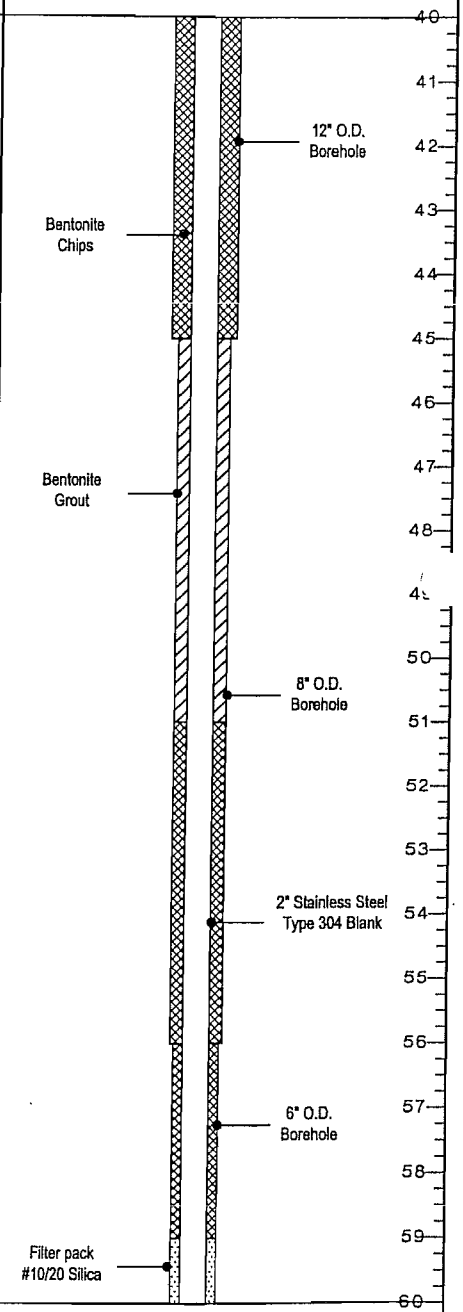
Boring Number: MWA-21b

Ground surface: Natural plants/grass

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41						SP	Fine to medium SAND, very dark gray (2.5Y 3/1), trace silt, trace (~5%) organics (wood), slightly micaceous, wet, weak to moderate odor.
41–42			80%	10 10 10 18			As above w/ indistinct odor and no organics (41.5' BGS).
42–43			70%	10 10 10 15			Trace rounded gravel up to 0.5" dia. at contact below.
43–44						ML	SILT, olive-brown (2.5Y 4/3), wet, no odor.
44–45			100%	5 5			Some fine to very fine sand (15-20%) Increasing sand to 40%, micaceous.
45–46			90%	4 4			
46–47						SM	Silty SAND, olive-brown (2.5Y 4/3), micaceous v. fine to fine sand, silt ~20-25%, wet.
47–48			100%	5 6 14 25		ML	SILT, dark gray-brown (2.5Y 4/2), slightly stiff, very moist to wet, weak odor. Some rocks @ 47.5' BGS (lens 2" thick), basalt rocks ~10-15%.
48–49							
49–50			100%	10 13 18 23		ML/ SP	Fine to medium SAND, very dark gray (10YR 3/1), 2" dia. rock @ 49.5' BGS, micaceous w/ silt layers, dark gray brown (10YR), predominantly silt below 50' BGS.
50–51						SP	Fine SAND (10YR 4/2), trace to some silt, micaceous.
51–52			80%	12 11 12 25		ML	SILT, dark gray-brown, (10YR 4/2).
52–53						ML/ SM	Silty SAND/sandy SILT, dark gray-brown (10YR 4/2), very fine to fine sand, micaceous, wet.
53–54			30%	13 50-4"		SM	Silty SAND, brown (10YR 4/3), very fine to fine sand, ~20-30% silt, micaceous.
54–55							BASALT, black, vesicular, poor to moderate induration, trace secondary minerals in vesicles, indistinct odor.
55–56							
56–57							Dark gray vesicular BASALT, brecciated slightly weathered zone (56-56.5' BGS), likely broken up as the core rod was seating. Clean fractures w/ some linear vesicular patterns (56.5 -57.25' BGS) (connected). Clean fracture zone (57.25-58' BGS). Weathered fracture zone 1/2-2" dia. pieces (not all surfaces weathered) (58-58.4' BGS). Weathering on fractures (58.4-59' BGS). No fractures (59-59.8' BGS).
57–58							
58–59							
59–60							
							Weathered fracture (59.8')

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 2 - 19 October 2001

Well Casing Elevation: 36.84'

Ground Surface Elevation: 34.25'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 4

Project No: 8601192.001.0726

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

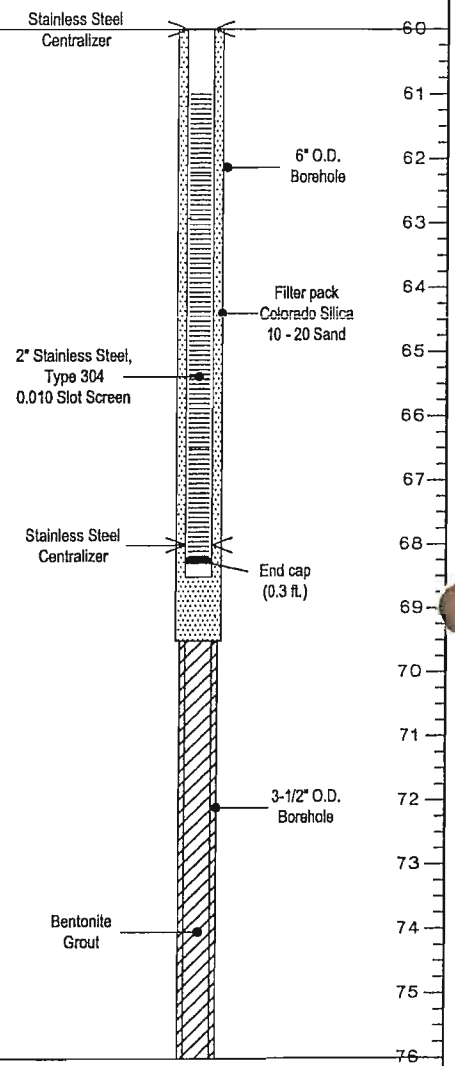
Boring Number: MWA-21b

Ground surface: Natural plants/grass

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
60							Dark gray vesicular BASALT, vertical fractures (59.8-60.25' BGS).
61							No fractures, slightly vesicular (60.25-61' BGS).
62							Moderately to highly vesicular, some weathering, fractured (61-62.5" BGS).
63							Slightly vesicular, moderately weathered, fractured. Fractures increase with depth, nearly all are weathered (62.5-63.75' BGS).
64							Highly weathered, crumbly, very poorly indurated, little original structures intact, clay minerals abundant (63.75-64.5' BGS).
65							Highly vesicular zone w/ weathered fractures, poorly indurated (64.5-66.5' BGS).
66							
67							Highly vesicular zone, weathered fractures w/ linings of vesicles filled with secondary minerals, increased induration (66.5-68.5' BGS).
68							No fractures (68.5-69' BGS).
69							Slightly fewer vesicles (69-70' BGS).
70							Slightly vesicular, small vesicles and small fractures completely filled with secondary minerals (70-72' BGS).
71							
72							Fewer vesicles, trace of secondary mineralization, more massive (72-73.5' BGS).
73							
74							Material from 74.1-74.3 is broken up, but fractures are not weathered (73.5-74.5' BGS).
75							Vesicular BASALT, weathered, poorly indurated, crumbly (74.5-76' BGS).
76							
77							
78							
79							
80							

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 2 - 19 October 2001

Well Casing Elevation: 36.84'

Ground Surface Elevation: 34.25'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 4 of 4

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

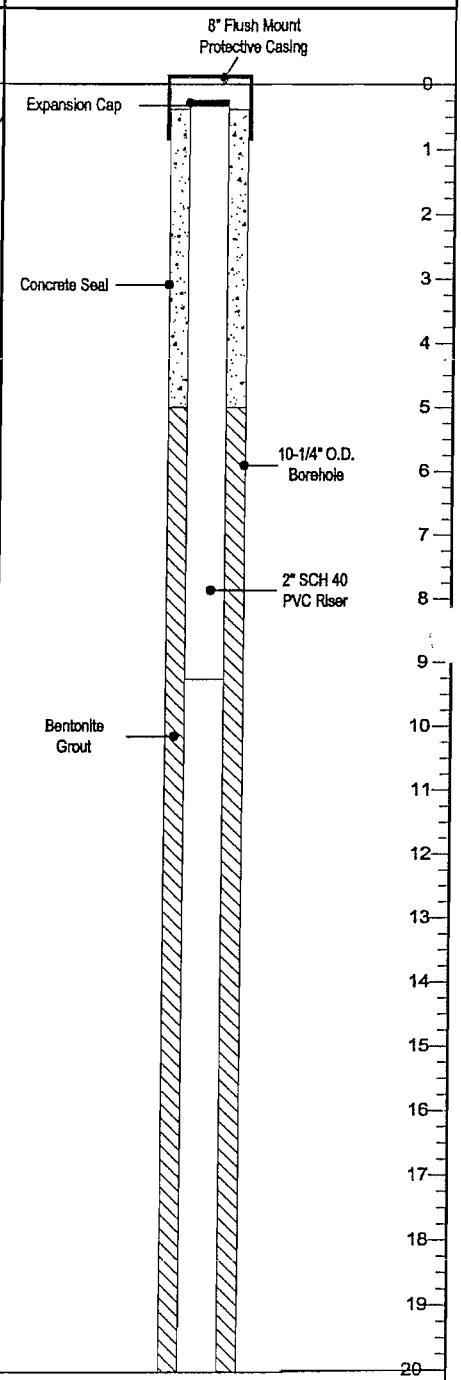
Monitoring Well: MWA-22

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GM	Silty sandy GRAVEL, very dark brown (10YR 2/2), slightly moist.
1		23.7	60%	NA		SM	Slightly silty, fine to medium SAND, very dark gray-brown (10YR 3/2), slightly moist.
2							
3		0.0	60%	NA			
4							As above w/ trace rounded gravel.
5		0.0	100%	NA			
6							
7		2.9	100%	NA			
8						ML	SILT, very dark gray-brown (10YR 3/2), wet.
9		2.9	100%	NA			Color change to very dark gray (2.5Y 3/1), wet.
10						SM	Slightly silty, fine SAND, yellow-brown (10YR 5/4), micaceous, slightly moist.
11		2.9	100%	NA			
12						SM/ ML	Slightly silty fine SAND to slightly sandy SILT, dark gray (5YR 4/1), micaceous, moist.
13		0.0	100%	NA			
14							
15		0.0	100%	NA			
16						ML	SILT, dark gray (5Y 4/1), wet.
17		2.9	100%	NA			
18							
19		2.9		NA			Note: MWA-22 was installed by overdrilling borehole B-65. The lithologic description from 0-20' BGS is from borehole B-65.
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 7 June 2001

Well Casing Elevation: 34.65'

Ground Surface Elevation: 34.96'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

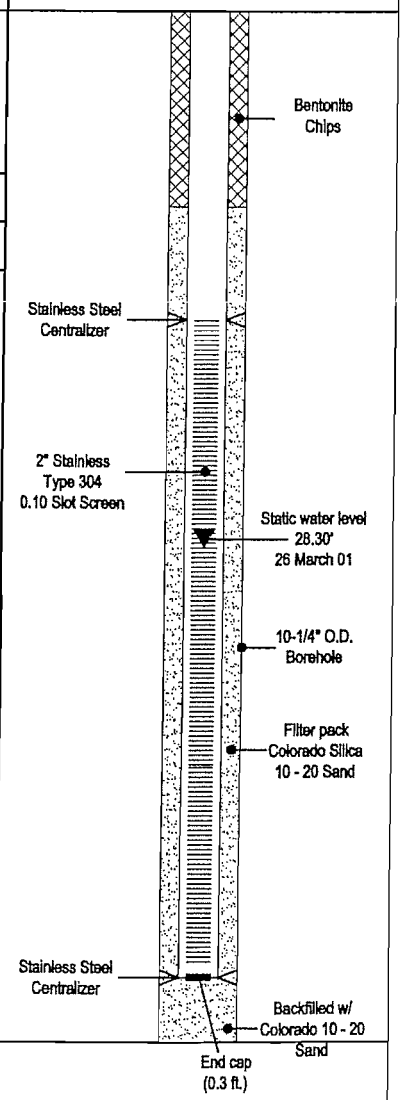
Boring Number: MWA-22

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20		0.0	NA	0%	1 1 1		ML	SILT, black (5Y 2.5/1), wet, soft.
21		0.0	NA	100%	2 3 3			
22								
23		0.0	NA	100%	6 8 14		SP	Medium to coarse SAND, very dark gray-brown (10YR 3/2), wet.
							SM	Silty fine to medium SAND, black (5Y 2.5/1).
24							SP	Medium to coarse SAND, very dark gray-brown (10YR 3/1), wet.
25		0.0	NA	100%	4 7 8			
26		0.0	NA	100%	2 3 4			As above, grading to fine SAND.
27		59	NA	100%	2 6 6			As above, slight odor.
28								
29		0.0	NA	100%	4 7 12			As above, no odor.
30		2.9	NA	100%	3 9 20			Fine to medium SAND, black (2.5Y 2.5/1), wet w/ trace carbonized organics.
31								
32		2.9	NA	100%	4 6 9			
33								
34			NA	100%	2 3 6			
35			NA	100%	26 50 for 6"			
36							ML	SILT, black (5Y 2.5/1), dense, moist.
								Total depth 36.0' BGS
37								
38								
39								
40								

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 07 June 2001

Well Casing Elevation: 34.65'

Ground Surface Elevation: 34.96'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.001.0724

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

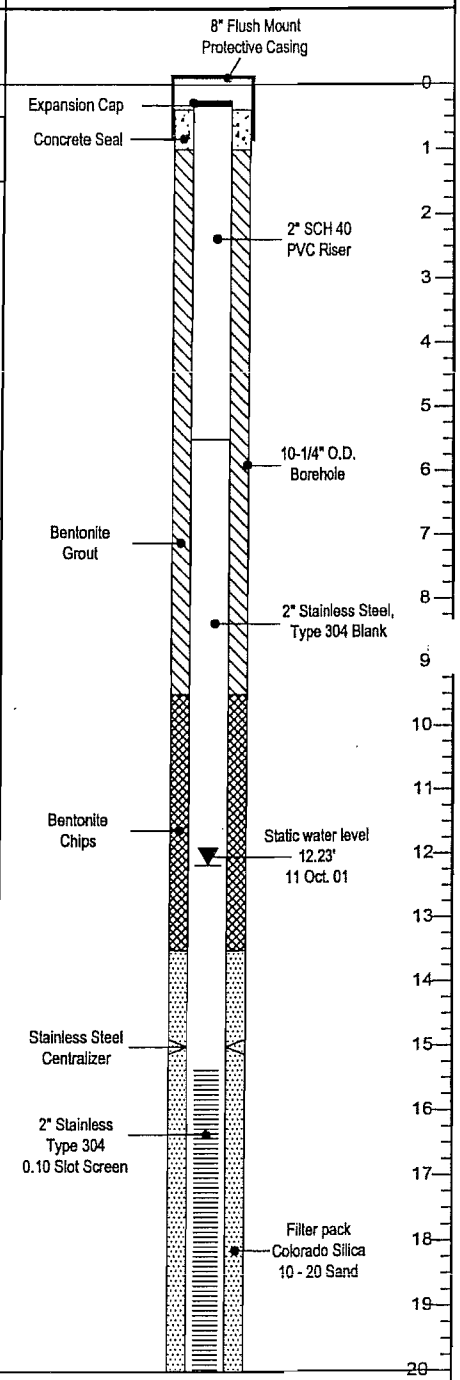
Monitoring Well: MWA-23

Ground surface: Gravel

Geologist: Jeffrey S. Paul

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GM	ASPHALT
1	SO1300	2.0	45%	20 28 22		SW	Gravelly SAND, fine angular gravel and fine to coarse sand, dark gray (10YR 4/1), dry.
2						SP	Fine SAND, dark olive-brown (2.5Y 3/3), dry, medium dense.
3			55%	9 9 10			2" of pinkish white sand w/ red, green and black crystalization @ 2.5 - 2.7' BGS.
4	SO1301	1.6	70%	9 9 11			1/16" pinkish white sand w/ red, green and black crystalization @ 3.5' BGS.
5							
6			70%	4 6 5			
7			75%	2 3 5		ML/SM	Sandy SILT, fine sand ~ 5-15%, dark olive-brown (2.5Y 3/3), damp, stiff.
8							
9	SO1302	2.5	70%	4 6 7			Wet SILT @ 9.5' BGS.
10			70%	7 7 9		SP	Fine SAND, dark olive-brown (2.5Y 3/3), slightly moist, medium dense.
11							
12			100%	7 10 10			Color change to black (7.5YR 2.5/1), wet.
13	SO1303	2.2	100%	10 10 11			
14							Color change to dark olive-brown (2.5Y 3/3), wet.
15			100%	7 13 12			
16	SO1304	1.5	100%	6 8 15			Wet to saturated.
17							
18				6 12 15			
19			100%	19 23 36			Saturated.
20							Silt layer (2" thick) @ 19.5' BGS, wet.

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 8 October 2001

Well Casing Elevation: 34.65'

Ground Surface Elevation: 34.96'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

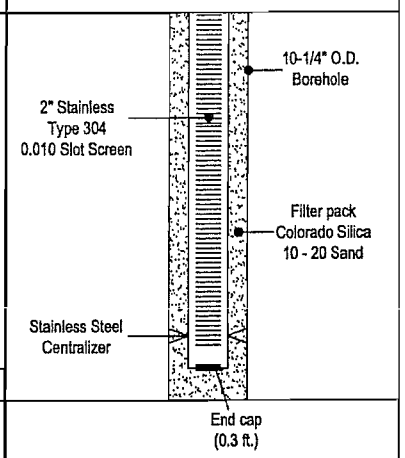
Boring Number: MWA-23

Ground surface: Asphalt

Geologist: T. Sparacio

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO1305	3.4	NA	95%	12 23 36		SP	Fine SAND, dark olive-brown (2.5Y 3/3), saturated, very dense.
22				100%	12 23 41			
23–24				80%	30 50/3			
25	SO1306	3.4	NA	100%	12 36 50/2			
26							ML	SILT, very dark gray (7.5YR 3/1), moist.
								Total depth 26.0' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 8 October 2001

Well Casing Elevation: 34.86'

Ground Surface Elevation: 35.16'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

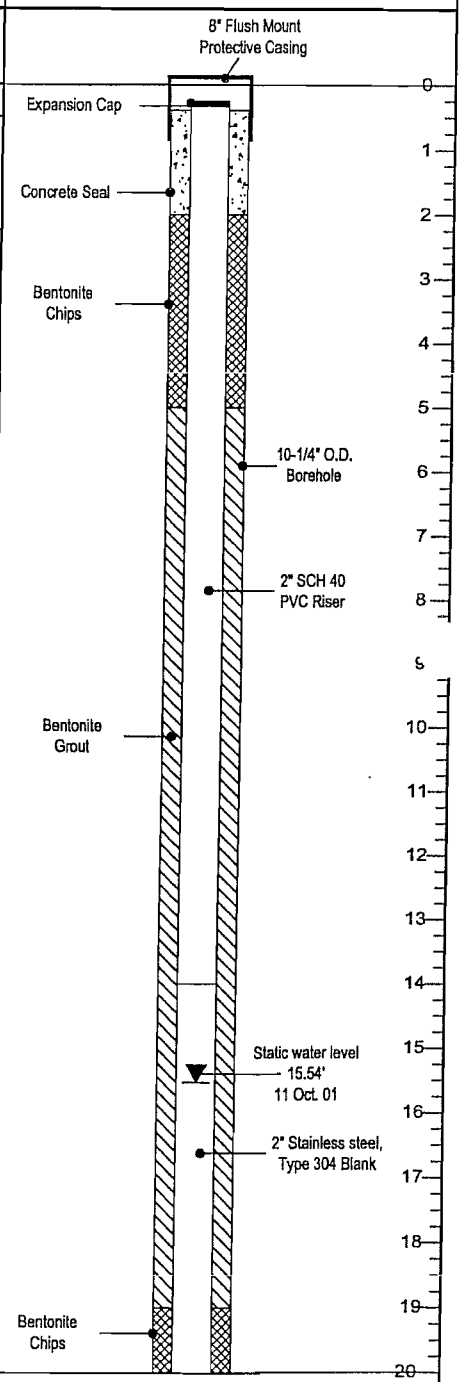
Monitoring Well: MWA-24

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GM	ASPHALT
1–2	SO1307	3.6	55%	48 38 41		SW	Gravelly SAND, dark olive-brown (2.5Y 3/3), fine angular gravel and fine to medium sand, very dense.
3			70%	38 28 25		SP	Fine SAND, dark olive-brown (2.5Y 3/3), dense, slightly moist. Silt lenses (2" thick), light yellow-brown (2.5Y 6/3) @ 2.75 and 3.0' BGS.
4	SO1308	3.0	50%	19 18 25			Sandy silt lens (2" thick) @ 4.5' BGS.
5–6			55%	4 9 11			Sandy silt lens (2" thick) @ 6.0' BGS.
7–8			40%	9 8 7		SM	Silty SAND (silt: ~15%), dark olive-brown (2.5Y 3/3), wet.
9	SO1309	3.9	100%	9 15 19		ML	SILT, grayish brown (2.5Y 5/2), wet.
10			65%	6 6 6			As above, increasing moisture with depth.
11–12			50%	8 10 11			As above, increasing sand with depth grading to sandy SILT, slightly moist.
13	SO1310	4.3	100%	10 12 14			Sand lens (1" thick), very dark gray (2.5Y 3/1), moist.
14–15				8 9 13		SP	Fine SAND, very dark gray (2.5Y 3/1), slightly moist.
16	SO1311	2.8	65%	8 20 27			
17–18			80%	14 24 23			Grading to fine sand with trace silt, slightly moist.
19			85%	4 4 5		SM	Silty fine SAND (silt: ~15%), very dark gray (2.5Y 3/1), slightly moist.
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 9 October 2001

Well Casing Elevation: 35.64'

Ground Surface Elevation: 36.00'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.004.0202

Project: Acid Plant RI

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

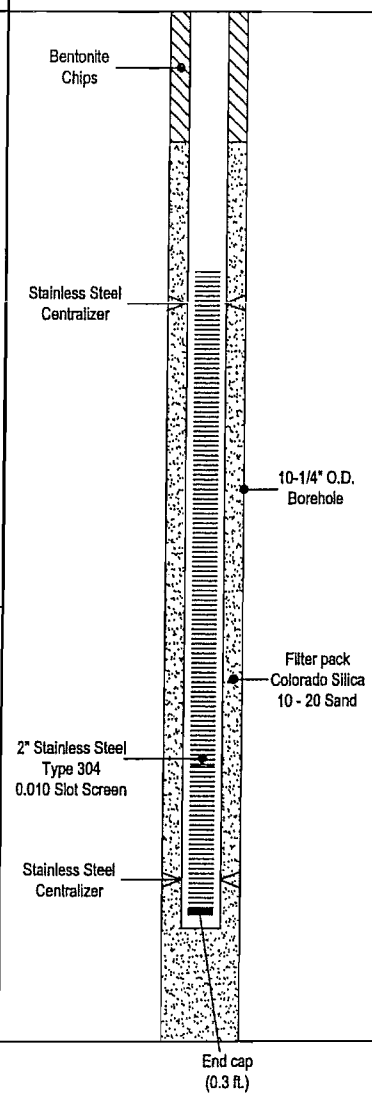
Boring Number: MWA-24

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21	SO1312	4.0	NA	85%	6 7 11		SM/ ML	Sandy SILT, very dark gray (2.5Y 3/1) w/ syrup-like liquid in sample (but less viscous), brown, slight odor.
22–23				85%	11 25 31			
23–24				100%	10 24 32			
25–26	SO1313	4.7	NA	100%	16 30 50-3"			
26–27				60%	7 30 50-4"			SAND lens (1" thick), moist.
28–29	SO1314	3.9	NA	60%	4 12 32			
29–30				75%	5 7 12		ML	Grades to SILT, very dark gray (2.5Y 3/1).
31–32	SO1315	27	NA	85%	8 6 35			
32–33							SP	SAND, very dark gray (7.5YR 3/1), moist.
33–34				65%	10 48 39		ML	SILT, very dark gray (2.5Y 3/1).
35–36					13 22 32			
36								Total depth 36.0' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 9 October 2001

Well Casing Elevation: 35.64'

Ground Surface Elevation: 36.00'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

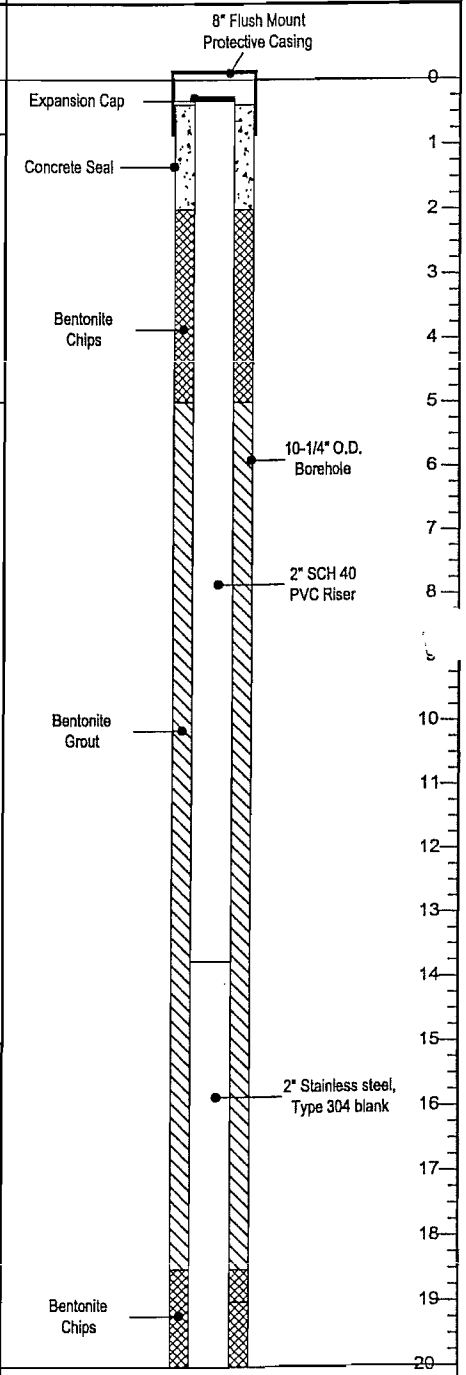
Monitoring Well: MWA-25

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GM	ASPHALT (10" thick)
5–6		1.2	35%	8 11 14	X	SP	Fine SAND, olive-brown (2.5Y 4/4), medium dense, slightly moist.
10–11		0.8	0%		X		As above w/ trace silt.
15–16		0.6	75%	14 14 14	X	ML/ SM	Silty SAND/sandy SILT, gray (2.5Y 5/1), medium dense, moist to wet.

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 10 October 2001

Well Casing Elevation: 35.72'

Ground Surface Elevation: 36.13'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

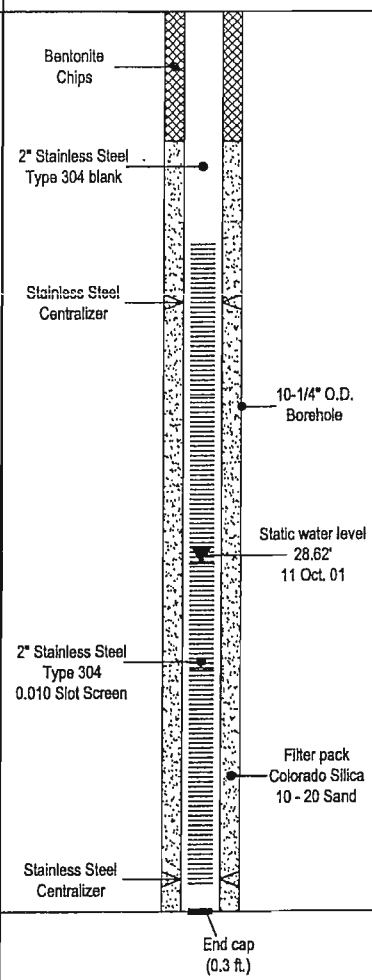
Boring Number: MWA-25

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21		0.8	NA	85%	21 35 50-3"		SP	Fine SAND, dark olive-brown (2.5Y 3/3), very dense, slightly moist.
25–26		1.1	NA	75%	13 33 38			
27		0.3	NA	75%	22 24 28			
28–29		0.2	NA	75%	18 32 36			As above, wet to saturated.
30		0.0	NA	75%	12 26 30			
31–32		0.0	NA	75%	10 14 27			
33–34		0.1	NA		20 35 50-4"			
34								Total depth 34.0' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 10 October 2001

Well Casing Elevation: 35.72'

Ground Surface Elevation: 36.13'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

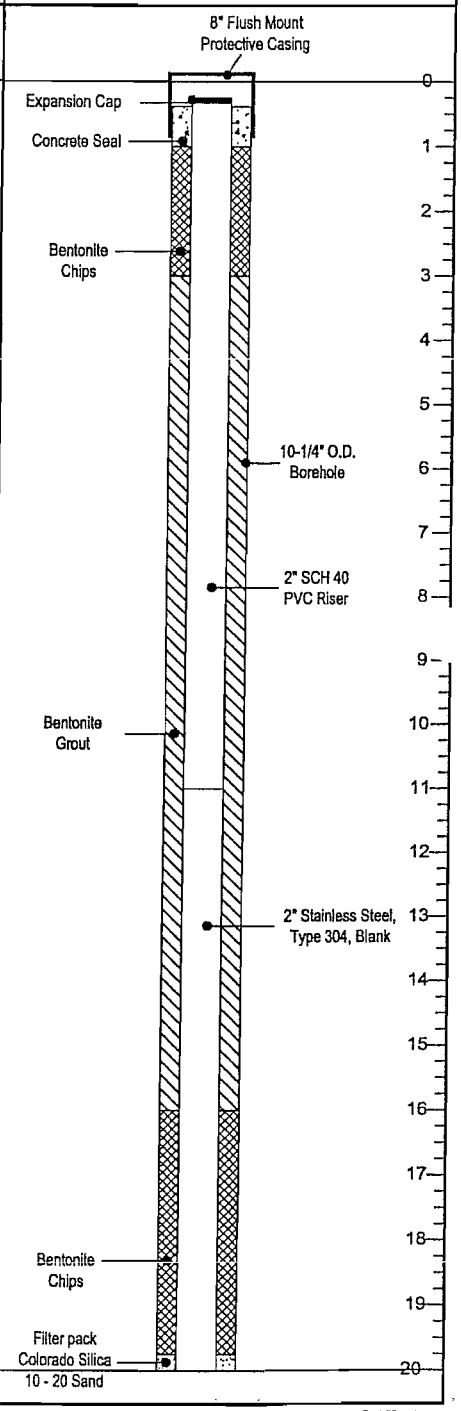
Location: Portland, OR

Monitoring Well: MWA-26

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 8 October 2001

Well Casing Elevation: 35.73'

Ground Surface Elevation: 36.08'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

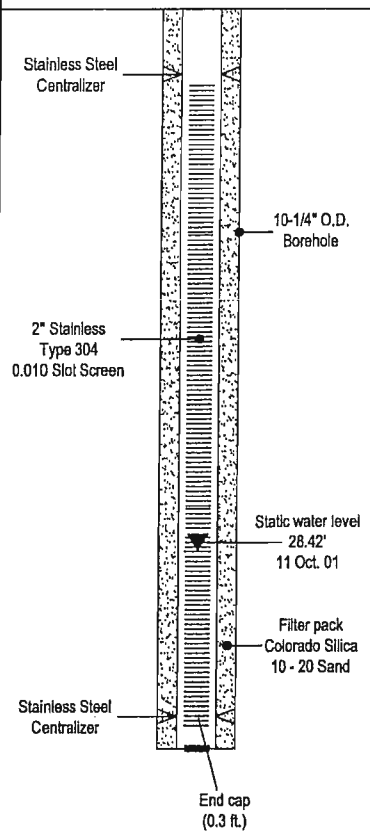
Boring Number: MWA-26

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–28							SP	Fine SAND, dark olive-brown (2.5Y 3/3), slightly moist, loose.
29				60%	9 9 12		SP	Fine to medium SAND, brown (7.5Y 4/2), trace silt, micaceous, medium dense, wet.
30–31				90%	12 15 18			As above w/ carbonized wood chips.
32								Sandy SILT, brown (7.5Y 4/2), very fine to medium sand, trace carbonized organics, micaceous, very moist.
								Total depth 31.5' BGS

WELL CONSTRUCTION DETAIL



DEPTH (Feet): 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40

Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 10 October 2001

Well Casing Elevation: 35.73'

Ground Surface Elevation: 36.08'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

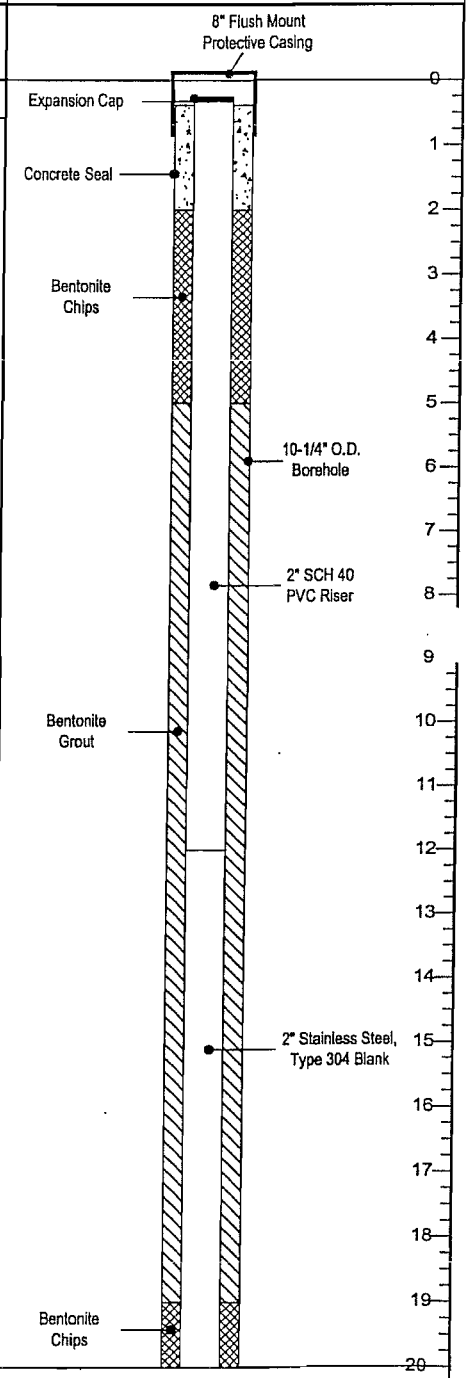
Monitoring Well: MWA-27

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GM	ASPHALT (7" thick)
1			0%	50-6"		SP	Fine SAND, very dark brown (2.5Y 3/2), medium dense to dense, slightly moist.
2			0%	27 37 50-4"			
3							No recovery, sheen, slight odor.
4	SO1317	0.0	0%	5 35 37			
5			60%	7 16 18		SP	Silt lens (1" thick) @ 5.0' BGS. Fine SAND, very dark brown (2.5Y 3/2), slightly moist, loose.
6			55%	9 7 8			
7							
8	SO1318	0.1	70%	8 14 15			
9			70%	4 8 10			
10							
11			75%	6 11 14			
12							
13	SO1319	0.9	90%	5 7 15			
14			90%	11 16 18			
15							
16			100%	8 13 16			
17	SO1320	0.2	85%	10 16 18			
18							
19			100%	14 25 27			
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 10 October 2001

Well Casing Elevation: 34.92'

Ground Surface Elevation: 35.35'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

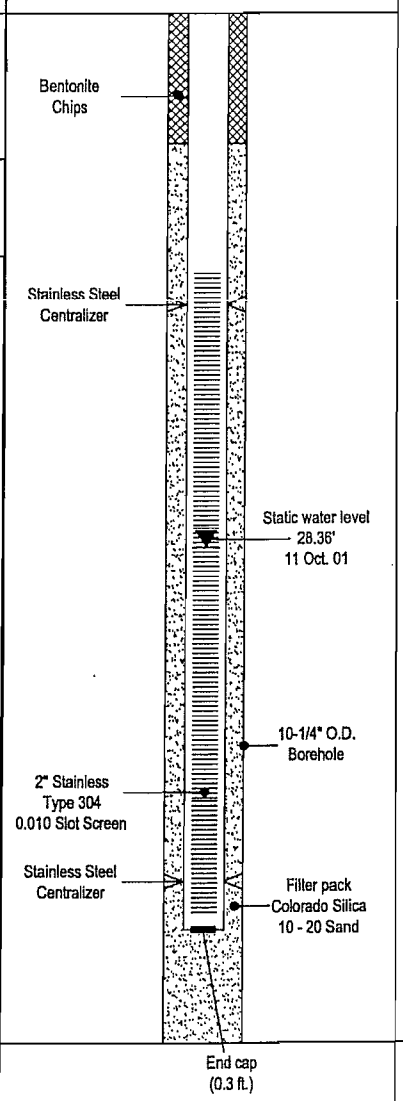
Boring Number: MWA-27

Ground surface: Asphalt

Geologist: T. Sparacio, E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20					14			
				100%	25 27		SP	Fine SAND, dark gray-brown (2.5Y 3/2), dense, slightly moist.
21								
22	SO1321	0.0		90%	15 21 25			
23				90%	12 16 18		ML	SILT, dark gray-brown (2.5Y 3/2), trace mica, very stiff, slightly moist, .
24							SP	SAND, dark gray-brown (2.5Y 3/2), medium dense to dense, slightly wet. SILT lens (1" thick).
25	SO1322	0.0		85%	11 22 30			
26				85%	18 28 25			
27								
28				100%	8 12 12			Saturated @ 28' BGS.
29	SO1323	1.4		80%	10 10 11			
30								
31				100%	4 8 15			
32	SO1324	0.1		100%	7 25 27			
33								
34				90%	23 50-3"			
35				75%	10 21 30			Wood debris @ 35'9" -36' BGS.
36								Total depth 36' BGS
37								
38								
39								
40								

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling, Inc.

Drill Method: Hollow Stem Auger

Drill Date: 10 October 2001

Well Casing Elevation: 35.92'

Ground Surface Elevation: 35.35'

Borehole Diameter: 10-1/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

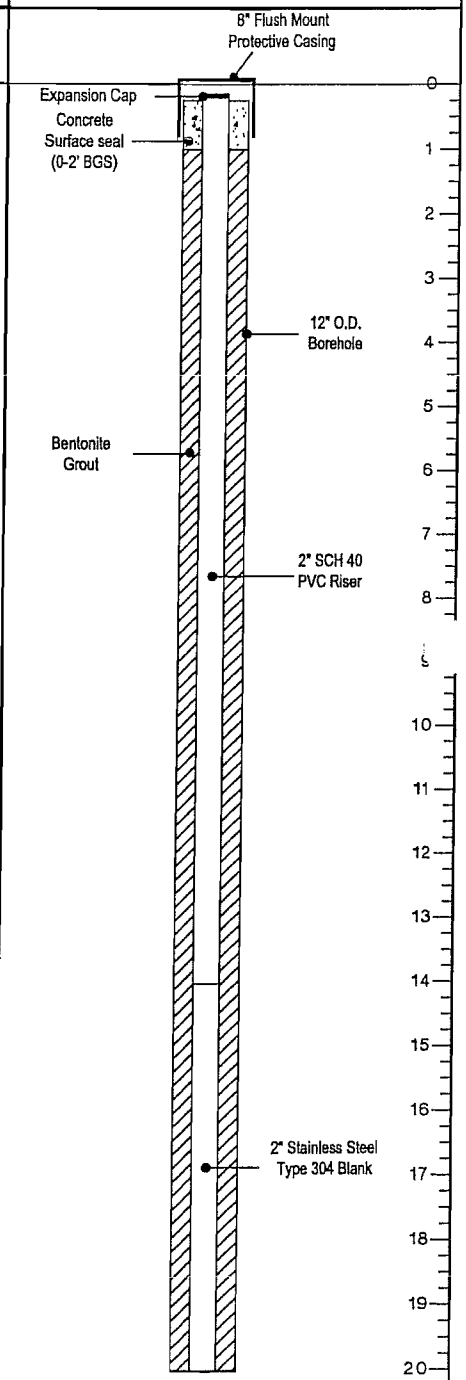
Location: Portland, OR

Boring Number: MWA-28i

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 29 October - November 2 2001

Well Casing Elevation: 35.89'

Ground Surface Elevation: 36.20'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

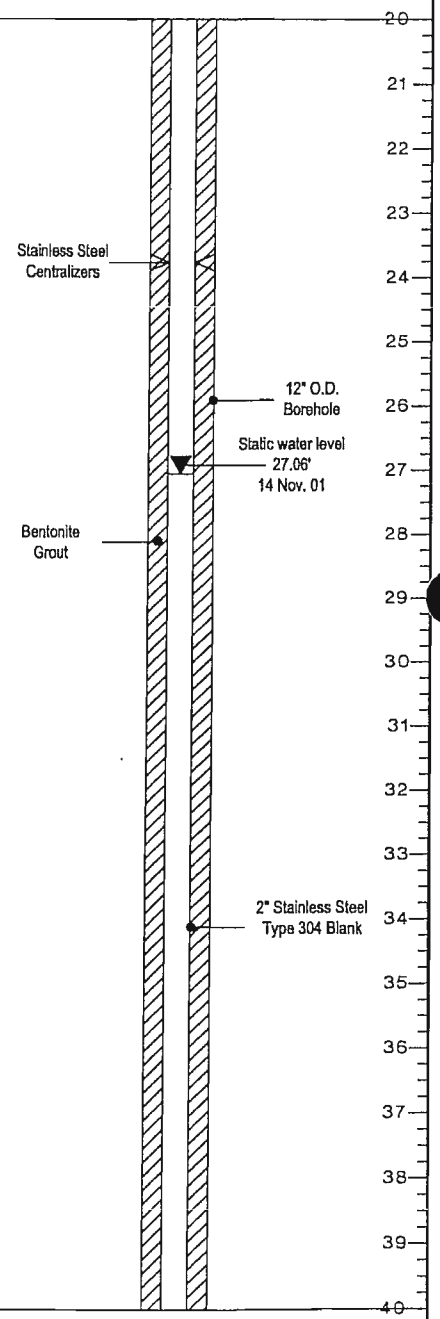
Boring Number: MWA-28i

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
34–35		2.1	70%	15 15 28		ML SP	Sandy SILT, dark gray-brown (10YR 4/2), fine sand, moist.
35–36		2.1	40%	30 40 30			Fine to medium SAND (~2% silt), very dark gray-brown (10YR 3/2), trace carbonized organics, slightly micaceous, wet.
36–37		2.1	75%	13 23 25		SM SP	Silty, very fine SAND (~40% silt), dark gray-brown (2.5Y 4/2), micaceous, very moist. SILT lens (~0.8" thick @ 37.5' BGS), brown (10YR 4/3), underlain by ~0.5" carbonized organics.
38–39		2.1	65%	15 20 20			Fine to medium SAND, brown (10YR 4/3), trace mica and non-carbonized organics, very moist to wet. Trace silt carbonized organics @ 39.5' BGS.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 29 October - November 2 2001

Well Casing Elevation: 35.89'

Ground Surface Elevation: 36.20'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 2 of 3

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

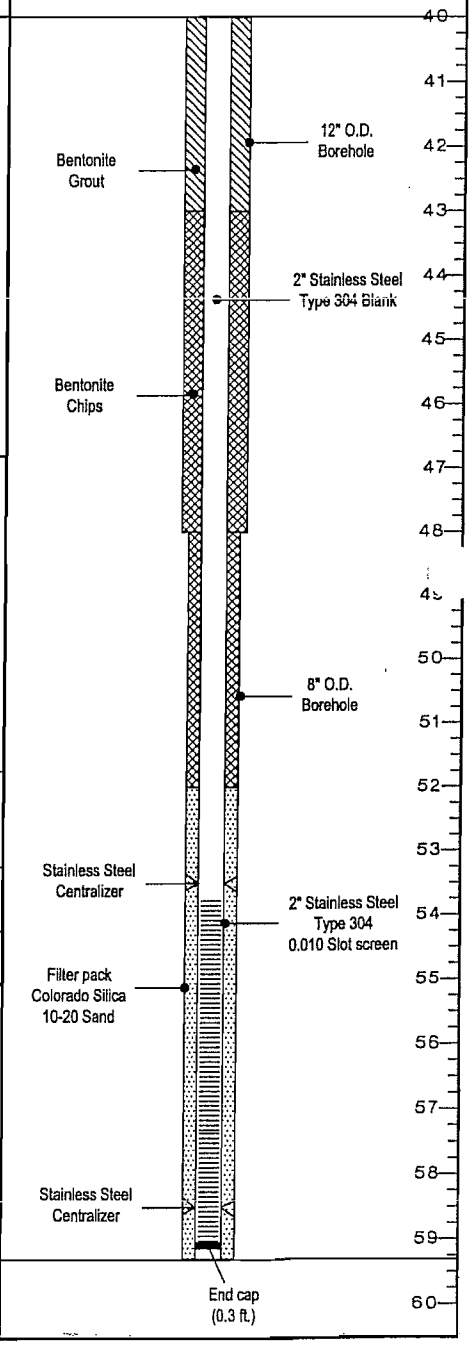
Boring Number: MWA-28i

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41		2.1	55%	10 12 15		SP	Fine to medium SAND, brown (10YR 4/3), trace mica, very moist to wet.
41–42		2.1	90%	8 15 20			As above w/ silt lamination (~0.2" thick) @ 42.6" BGS, no organics.
42–43		2.1	75%	8 11 17			As above w/ silt lamination (~0.5" thick) @ 43.8" BGS.
43–44		2.1	75%	8 12 18			As above w/ trace (<1%) organics.
44–45		2.1	90%	6 12 15		ML	SILT, light olive-brown (2.5Y 5/3), trace to some clay, trace organics, stiff, some orange mottling, moist.
45–46		2.1	90%	7 16 27			
46–47		0.8	100%	13 20 32			Color change to olive brown (2.5Y 4/3) w/ trace to no clay.
47–48		0.5	100%	5 11 18			Color change to light olive brown (2.5Y 5/3) w/ trace to some clay, very moist to wet.
48–49		0.7	100%	6 11 19			As above w/ 1 piece (~1/8" dia.) white crystalline material @ 52.3' BGS.
49–50		0.5	100%	5 11 17		SM/ ML	Silty SAND/sandy SILT, olive-brown (2.5Y 4/3), very fine sand, micaceous, wet.
50–51		0.4	100%	6 11 20		SM	Silty fine SAND, dark olive-brown (2.5Y 3/3), 20-25% silt, micaceous, trace orange banding, wet. Decreased silt (~10-15%) below 55.5' BGS.
51–52		0.1	100%	10 18 30		ML	Color change to dark gray (N4/) @ 56.5' BGS. Sandy SILT, Dark Green gray (5G 3/1), very fine sand (~40%), micaceous, very moist.
52–53		0.0	100%	9 13		SM	Silty, very fine SAND, dark green gray (5G 3/1), silt (~15-20%), micaceous, wet.
53–60							Bottom of boring @ 59.2' BGS.

WELL CONSTRUCTION DETAIL



Drilled By: Tacoma Pump & Drilling

Drill Method: Cable tool

Drill Date: 29 October - November 2 2001

Well Casing Elevation: 35.89'

Ground Surface Elevation: 36.20'

Borehole Diameter: See construction detail

Datum: City of Portland Datum - 1929

Sheet: 3 of 3

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

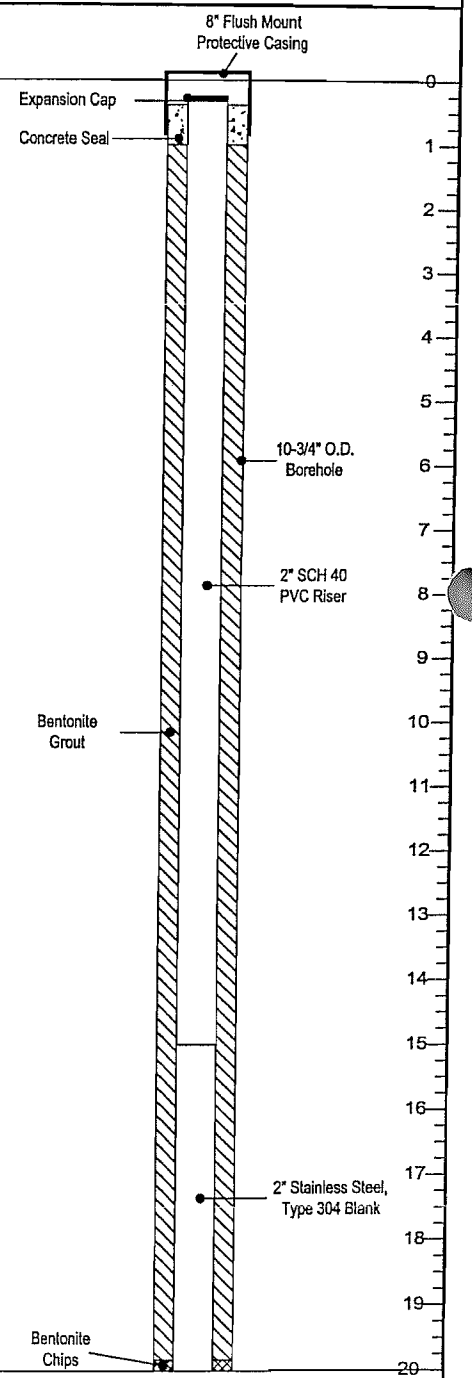
Monitoring Well: MWA-29

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0							ASPHALT (6" thick)
1			80%	50 6 5 5		GW	Sandy GRAVEL, black (10YR 2/1), fine to coarse sand, fine to 1.5" dia. gravel, moist.
2						SP	Fine SAND, brown (10YR 4/3), micaceous, moist.
3							
4							
5			15%	3 5 7		SM	Silty SAND, brown (7.5YR 4/3), fine to medium sand, micaceous, ~15-20% silt, very moist.
6							
7							
8							
9							
10			90%	5 8 6		SP	Fine to medium SAND, brown (10YR 4/3), micaceous, trace fine gravel (<2%), trace silt (<5%), very moist.
11							
12							
13							
14							
15			85%	3 5 8		ML	SILT, very dark gray (N3/), stiff, trace carbonized and non-carbonized wood, very moist to wet.
16						SM	Very fine SAND layer (2" thick), light brown-gray (2.5Y 6/2) @ 15.5'
17							Silty, very fine SAND, dark yellow-brown (10YR 4/4), some orange banding, trace organics (wood), moist.
18							
19							
20							

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 7-8 March 2002

Well Casing Elevation: 35.24'

Ground Surface Elevation: 35.57'

Borehole Diameter: 10-3/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

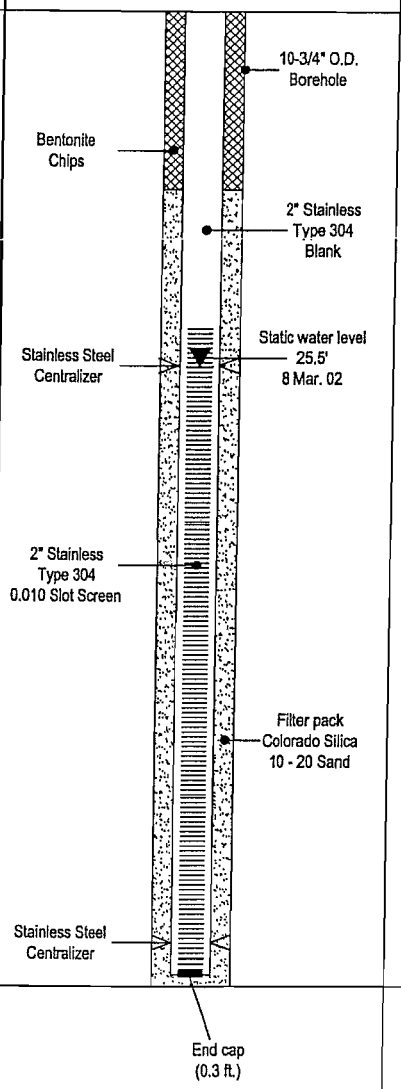
Boring Number: MWA-29

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–25				80%	6 50-5"		SM	Fine to medium, silty SAND, dark yellow-brown (10YR 3/4), ~15-25% silt, micaceous, very moist. Black silt lammations @ 20.8, 21 and 21.2' BGS (~1", 1/4", 1/4" respectively).
25–26				100%	3 4 5		ML/ SM	Silty, very fine SAND/very fine, sandy SILT, brown (10YR 5/3), micaceous, ~50-50 silt/ very fine sand, wet.
26–27				100%	6 2 5			As above with trace organics. As above, color change to dark gray-brown (10YR 4/2).
27–28				100%	2 2 4			Decreased sand content, increased wood content.
28–30				100%			ML SM ML SP	Grading to SILT, olive gray (5Y 4/2), some organics, slightly stiff, very moist. Silty fine SAND, dark yellow-brown (10YR 3/6), trace medium sand, wet.
30–32				100%	5 5 5		ML SP	Very fine, sandy SILT, grading to SILT, dark olive-gray (5Y 3/2), wet. Fine SAND, very dark gray-brown (2.5Y 3/2) <5% silt, wet.
32–34				100%	4 6 11			Very fine, sandy SILT, grading to SILT, dark olive-gray (5Y 3/2). Fine SAND, very dark gray-brown (2.5Y 3/2), <5% silt, wet.
34–35				100%	4 6			As above w/ carbonized wood layer (0.5" thick) @ 33.7' BGS. As above w/ trace carbonized wood.
35–40								Boring terminated at 35.2 BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 7-8 March 2002

Well Casing Elevation: 35.24'

Ground Surface Elevation: 35.57'

Borehole Diameter: 10-3/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

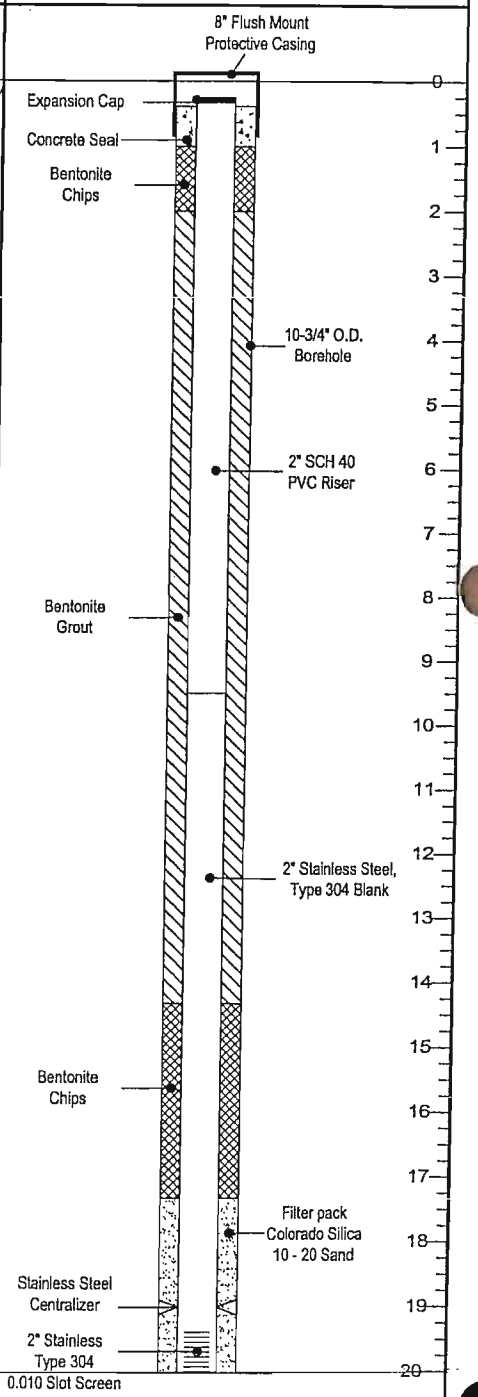
Monitoring Well: MWA-30

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
0						GW	ASPHALT (~1" thick)
1			65%	100 for 6"		GW	Silty sandy GRAVEL, brown (10YR 4/3), ~30 % fine to medium sand, ~50% fine to 1" dia. gravel, ~20% silt, trace red brick, moist.
2						GW	
3						SP	
4						SP	
5			50%	1 1 3 4		SP	Fine to medium SAND, dark gray-brown (2.5Y 4/2), micaceous, moist.
6						SP	
7						SP	
8						SP	
9						SP	
10			50%	25 5 5		SP	As above with trace (<2%) organics (non-carbonized wood).
11						SP	
12						SP	
13						SP	
14						SP	
15			65%	2 2 5		SP	
16						ML	SILT (2" thick), reddish brown (5YR 4/3), orange mottling, ~5% organics (wood), moist.
17						SM	Silty SAND, brown (10YR 4/3), ~10% silt, micaceous, moist.
18						SM	
19						SM	
20						SM	

WELL CONSTRUCTION DETAIL (not applicable)



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 5-6 March 2002

Well Casing Elevation: 36.36'

Ground Surface Elevation: 36.80'

Borehole Diameter: 10-3/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

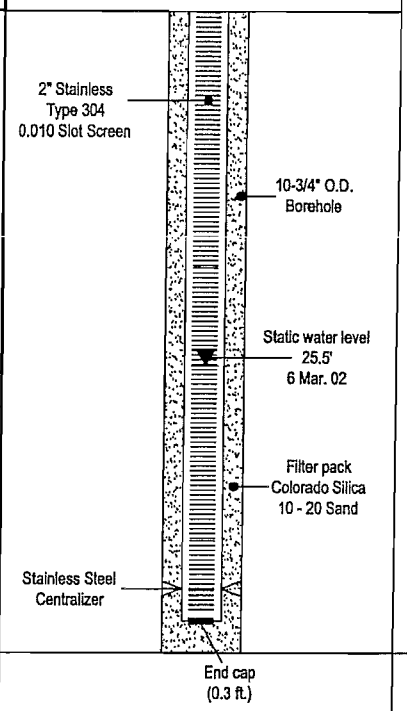
Location: Portland, OR

Boring Number: MWA-30

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	SHEEN	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20–21				80%	6 12 16		SM	Silty SAND, dark yellow-brown (10YR 3/6, ~10% silt, micaceous, moist.
21–25								Silty, very fine SAND, dark yellow-brown (10YR 4/4), micaceous, ~20% silt, moist.
25–26				80%	2 3 4		ML	As above, color change to very dark gray (5Y 3/1).
26–27							SP	Grading to SILT, very dark gray (5Y 3/1), medium stiff, trace fibrous organic material, wet.
27–28				80%	3 3 6		ML	Fine to medium SAND, brown (10YR 4/3), micaceous, very moist.
28–29				70%	3 6 7		SP	Very fine sandy SILT, very dark gray (5Y 3/1), ~1.5" thick.
29–30				100%	2		ML	Fine to medium SAND, dark gray-brown (2.5Y 4/2), wet (with 0.5" thick silt lens). As above, color change to black (N2.5 /) @ 29' BGS, oily sheen and moderate odor @ 29.0 to 29.2' BGS.
30–35								SILT, dark gray-brown (10YR 4/2), abundant (~20%) carbonized organic material (wood), moderately stiff, moist.
35–40								Boring terminated at 30' BGS



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 5-6 March 2002

Well Casing Elevation: 36.36'

Ground Surface Elevation: 36.80'

Borehole Diameter: 10-3/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 2 of 2

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

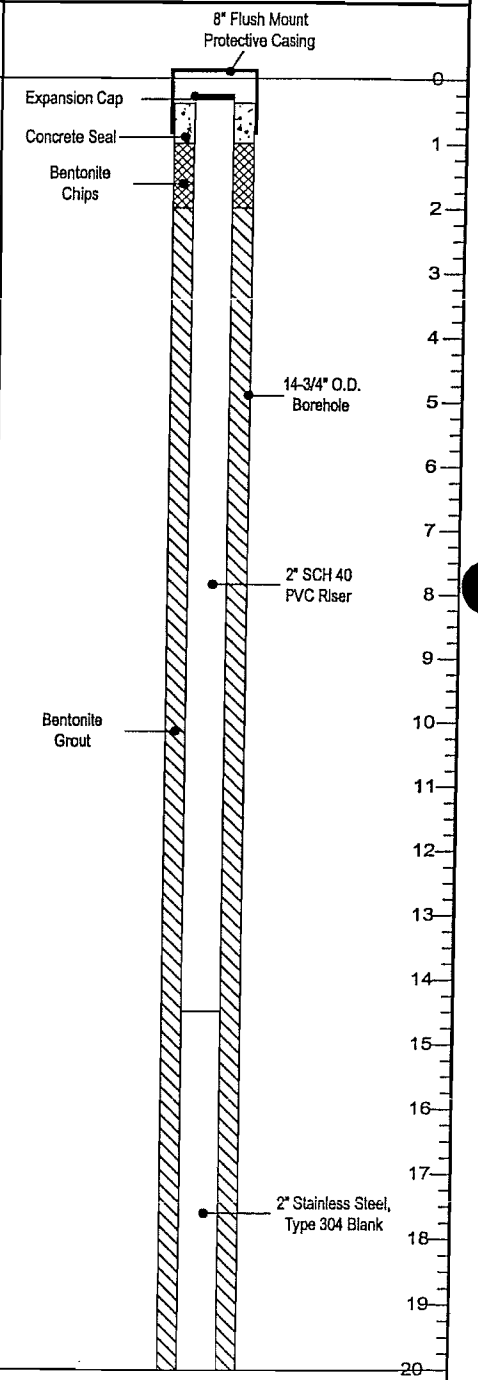
Location: Portland, OR

Monitoring Well: MWA-31i

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION	WELL CONSTRUCTION DETAIL (not applicable)
0							See log for monitoring well MWA-30 for lithology from 0-26.5' BGS.	



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 5-8 March 2002

Well Casing Elevation: 36.38'

Ground Surface Elevation: 36.80'

Borehole Diameter: 10-3/4" O.D.

Datum: City of Portland Datum - 1929

Sheet: 1 of 3

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

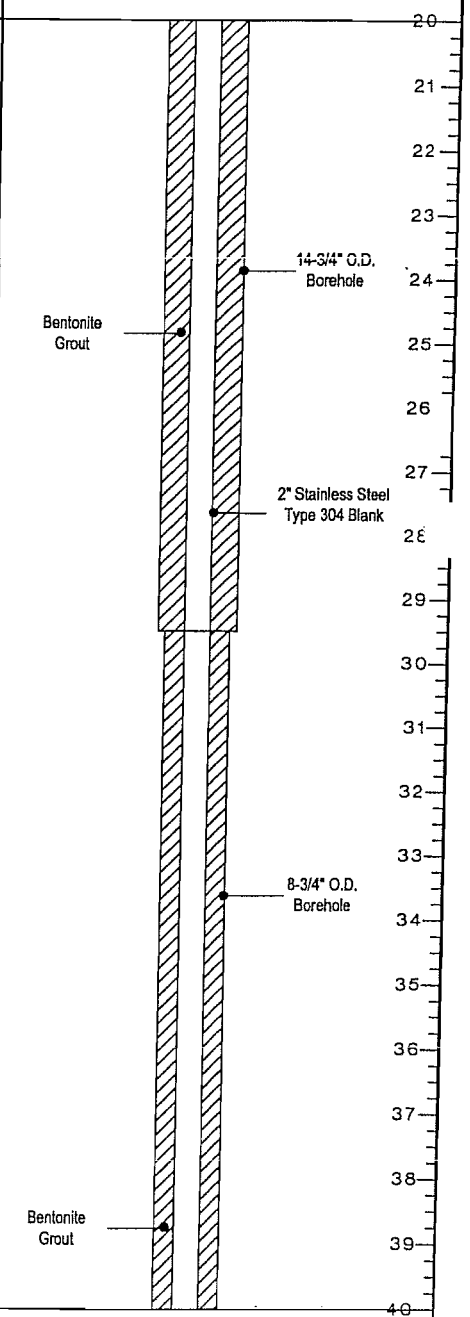
Monitoring Well: MWA-31i

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
20							
21							
22							
23							
24							
25							
26							
27			70%	9 6 8		ML/SM	Very fine sandy SILT/silty very fine SAND, very dark gray (2.5Y 3/1).
						SP	Fine to medium SAND, very dark gray (2.5Y 3/1), wet.
28			100%	6 4 7 8			
29							Black, oily fine to medium SAND, ~29.4-29.5' BGS, moderate odor.
30			30%	2		ML	SILT, dark gray (10YR 4/1), some carbonized organics, wet.
31			80%	8 60 50/4"			Sandy SILT @ 30' BGS, very dark gray-brown (2.5Y 3/2), ~35-40% sand, wet.
						SP	Gravelly, fine to medium SAND, dark gray-brown (2.5Y 4/2), fine to coarse gravel (~10 %), trace mica, wet.
32							
33			100%	3 4 7 9		ML	SILT, very dark gray-brown (2.5Y 3/2), ~2" thick, underlain by ~0.3" carbonized wood.
						SP	Fine to medium SAND, very dark gray-brown (2.5Y 3/2), trace carbonized wood, wet, silt lamination (0.5") @ 33.5' BGS, slight iridescent sheen below silt.
34	Grab groundwater sample GW03060201 (and duplicate GW03060202) from 34-36' BGS.		90%	3 4 6 8			As above, color change to dark gray-brown (2.5Y 4/2), ~2% fine gravel. Slight sheen at 35' BGS.
35							
36							
37			100%	2 3 5 8			
38						ML	SILT (1" thick) @ 37.5' BGS, dark gray-brown (2.5Y 4/2).
						SP	Fine to medium SAND, very dark gray-brown (2.5Y 3/2), trace carbonized wood and fine gravel. Silt laminations @ 39.5' and 40' BGS, 0.5" and 1" thick respectively.
39			100%	4 4 5 6			
40							

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 5-8 March 2002

Well Casing Elevation: 36.38'

Ground Surface Elevation: 36.80'

Borehole Diameter: 10-3/4" O.D.

Datum: City of Portland Datum - 1929

Project No: 8601192.004.0202

Project: Chlorate Plant Investigation

Client: ATOFINA Chemicals, Inc.

Location: Portland, OR

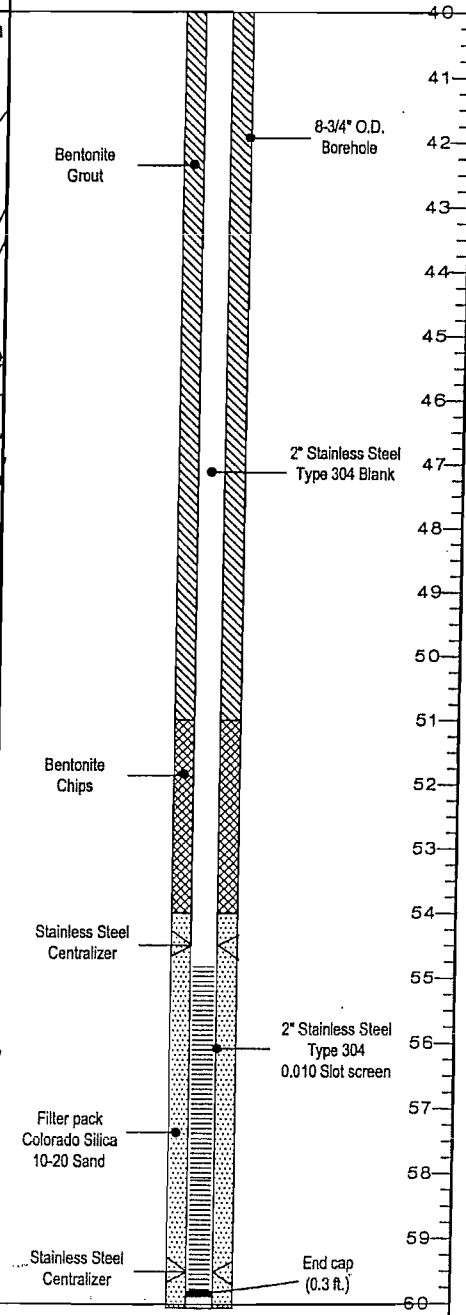
Monitoring Well: MWA-31i

Ground surface: Asphalt

Geologist: E. Dodak

DEPTH (Feet)	SAMPLE NUMBER	OVM (ppm)	% RECOVERY	BLOW COUNT	INTERVAL	GROUP SYMBOL	LITHOLOGIC DESCRIPTION
40–41	Grab groundwater sample GW03070201 collected from 40.2-42' BGS.		100%	4 7 10 16		SP	Fine to medium SAND, very dark gray-brown (2.5Y 3/2), trace carbonized wood and fine gravel. Silt laminations @ 41.2' and 41.5' BGS, 1" and 0.25" thick respectively.
41–42			100%	3 4 7 16		SM	Silty fine SAND, grayish brown (2.5Y 5/2), micaceous, ~10% silt, some very fine sand. Silt laminations dark gray-brown @ 42.5' and 42.7' BGS, 1.5" and 1" thick respectively.
42–43						ML	SILT, dark gray-brown (2.5Y 4/2), very moist.
43–44			90%	4 8 13 50-5"		SP	Fine SAND, gray-brown (2.5Y 5/2), micaceous, ~5% silt, wet, trace fine rounded gravel at 44.5' BGS. Silt laminations dark gray-brown (2.5Y 4/2) @ 45.2 and 45.3, 0.5" thick.
44–45						ML	
45–46	Grab groundwater sample GW03070202 collected from 46.2-48' BGS.		100%	3 4 12 16		SP / ML	SILT, light olive-brown (2.5Y 5/3), overlain by 0.5" gravelly sand. Fine SAND, dark gray-brown (2.5Y 4/2), micaceous.
46–47							
47–48			100%	6 8 10 12			SILT, light olive-brown (2.5Y 5/3), orange banding/mottling, ~10% clay, stiff. As above, ~5% clay, no orange banding/ mottling @ 48' BGS. As above, color change to olive-brown (2.5Y 4/3) @ 49.5' BGS, very stiff.
48–49							
49–50			30%	4 5 7 9			As above, color change to light olive-brown (2.5Y 5/3) @ 50.8' BGS.
50–51							
51–52				3 4 6 9			As above, stiff.
52–53							
53–54						ML/ SM	Sandy SILT/silty SAND, olive-brown (2.5Y 4/3), micaceous.
54–55	Grab groundwater sample GW03070203 collected from 55.2-57' BGS.		100%	3 5 9 15		ML	SILT, light olive-brown (2.5Y 5/3), trace orange mottling, very fine sandy silt from 54.4-54.7' BGS, wet.
55–56						SM	Silty very fine SAND, lt. olive-brown (2.5Y 5/3), micaceous, ~40-45% silt, very moist to wet.
56–57			100%	4 4 5 6		SP	Fine SAND, very dark olive-gray (5Y 3/2), micaceous, ~5% silt, wet.
57–58						ML/ SM	Interlayered SILT, silty very fine SAND and very fine sandy SILT, lt. olive-brown (2.5Y 5/3), wet in sandy layers.
58–59						SM	Silty v. fine SAND, olive brown (2.5Y 4/3) to gray-ish brown (2.5Y 5/2), micaceous, ~40-50 % silt.
59–60			100%	3 4 7 13		ML	SILT, lt. olive-brown (2.5Y 5/3), trace orange mottling, stiff, very moist to moist.
60							Boring terminated @ 60' BGS

WELL CONSTRUCTION DETAIL



Drilled By: Cascade Drilling

Drill Method: Hollow Stem Auger

Drill Date: 5-8 March 2002

Well Casing Elevation: 36.38'

Ground Surface Elevation: 36.80'

Borehole Diameter: 10-3/4" O.D.

Datum: City of Portland Datum - 1929

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BOREHOLE LOG

Project Number: 5223.00
Project Name: Atofina Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Tacoma Pump and Drill
Drilling Method: Cable Tool
Logged By: Brian Magee
Date(s): 05/20/03–05/22/03
Initial Water Level: 25.00'

Total Depth: 44.00'
Completed Depth: 42.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 12.00'
type: Stainless Steel Blank dia: 2.00in fm: 12.0' to: 37.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 37.00' to: 42.00'

Annular Fill:
type: Grout fm: 0.00' to: 32.00'
type: Bentonite fm: 32.00' to: 35.00'
type: #10–20 Sand Filter fm: 35.00' to: 42.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
						Asphalt/Gravel at surface.
						Not Sampled.
5		GM			9 50	SANDY SILTY GRAVEL (GM): brown, silt clasts up to 1.0". Slough from above.
					15	Slough from above.
		SW			11 10 13	GRAVELLY SAND (SW): brown, slightly silty, fine to medium grained, gravel clasts up to 1.5" interspersed in sand, moist.
		SM			15 25	SILTY SAND (SM): brown, coarse grained.
10		GM			23	SILTY GRAVEL (GM): some sand, clasts to 1.5".
		SM			23 15 28	SILTY SAND (SM): brown, medium grained. SILTY SAND (SM): as above.
		GM			33 50	SILTY GRAVEL (GM)
		SM			25 20 25	SILTY SAND (SM): brown, medium grained. SILTY SAND (SM): brown, slightly gravelly.
15					15 8 11 18 40	
					28 50	SILTY SAND (SM): brown.
20					18 25 33 60	SILTY SAND (SM): reddish brown, medium grained.
					10 17 23 45	
		ML			9 16 12 14	SILT (ML): gray, woody fragments. Slough from above. SANDY SILT (ML): gray, fine to very fine grained, one fragment of wood (2.0"), two 1.0" silty sand stringers toward the bottom.

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BOREHOLE LOG

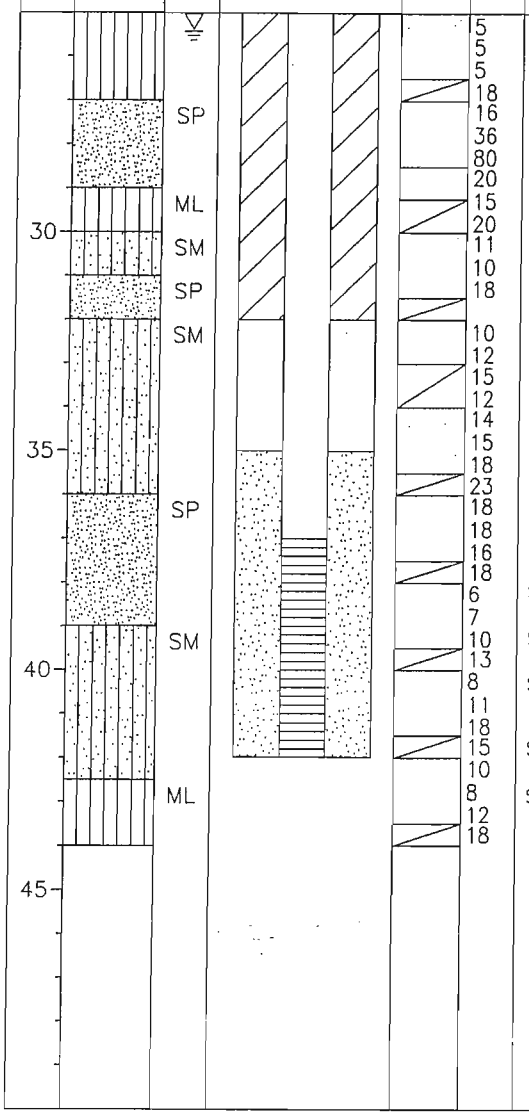
Project Number: 5223.00
Project Name: Atofina Chemicals - Monitoring Well Installation
Location: Portland, Oregon
Contractor: Tacoma Pump and Drill
Drilling Method: Cable Tool
Logged By: Brian Magee
Date(s): 05/20/03-05/22/03
Initial Water Level: 25.00'

Total Depth: 44.00'
Completed Depth: 42.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 12.00'
type: Stainless Steel Blank dia: 2.00in fm: 12.0' to: 37.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 37.00' to: 42.00'

Annular Fill:
type: Grout fm: 0.00' to: 32.00'
type: Bentonite fm: 32.00' to: 35.00'
type: #10-20 Sand Filter fm: 35.00' to: 42.00'



Blow Counts	Description/Soil Classification
5	SILT (ML): gray, very fine grained sand, some mica, saturated.
5	
5	SILT (ML): gray, very fine grained sand, some mica, saturated.
18	
16	SAND (SP): gray to brown, medium grained.
36	
80	SAND (SP): medium grained, black tar-like (smells like tar), sticky, hydrocarbon-like odor. PID = 2.4. Sample MWA-32i-28.5
20	
15	SILT (ML): some organics, dense, slightly moist. Sample MWA-32i-30.0
20	
11	SILTY SAND (SM): gray, very fine grained sand, woody fragments throughout, oily. Water in bailer is very oily.
10	
18	SAND (SP): red, slightly silty, medium grained.
10	SILTY SAND (SM): brown, with thinly laminated silt, some black staining.
12	SILTY SAND (SM): brown, medium grained, moist.
15	SILTY SAND (SM): yellowish brown, some thin laminated silt, medium grained, moist.
12	
14	SILTY SAND (SM): brown to yellowish brown, with some thin laminated silt.
15	
18	SILTY SAND (SM): as above, two 2.0" silt layers, dense.
23	
18	SAND (SP): brown, medium grained, slightly silty, one 1.0" silt layer (brown), some carbonized wood fragments.
18	
16	
18	
6	SAND (SP): brown, medium grained, slightly silty.
7	
10	SILTY SAND (SM): brown, some fine to medium sand, dense, 2.0" of silt in shoe of sampler.
13	
8	SILTY SAND (SM): slightly reddish brown, medium grained, with interbedded 1.0" silt layers, brown, slightly plastic.
11	
18	
15	SILTY SAND (SM): brown, medium grained, some thinly laminated silt layers (0.1"). brown, slightly plastic.
10	
8	SILT (ML)
12	
18	

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BOREHOLE LOG

Project Number: 5223.00

Project Name: Atofina Chemicals – Monitoring Well Installation

Location: Portland, Oregon

Contractor: GeoTechnical Exploration Inc.

Drilling Method: Hollow Stem Auger

Logged By: Brian Magee

Date(s): 05/30/03

Initial Water Level: 15.00'

Total Depth: 30.00'

Completed Depth: 30.00'

Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 10.00'
type: Stainless Steel Blank dia: 2.00in fm: 10.0' to: 20.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 20.00' to: 30.00'

Annular Fill:
type: Grout fm: 0.00' to: 16.00'
type: Bentonite fm: 16.00' to: 19.00'
type: #10-20 Sand Filter fm: 19.00' to: 30.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
						Concrete
		GM				Gravel base
		SW				SAND (SW): brown, slightly yellowish, medium grained.
5						SAND (SW): reddish brown, slightly silty, medium grained.
		GC				GRAVEL WITH CLAY (GC): black clay, very sticky, plastic. Refusal at 7.0' bgs, very hard with geoprobe.
						Very hard drilling with Hollow Stem Auger rig, unable to drive sampler.
10						
						Very hard drilling with Hollow Stem Auger rig, unable to drive sampler.
		ML				SILTY SAND/SANDY SILT (ML): brown, mucky, gooey, saturated.
15		ML/SM				INTERBEDDED SILTS AND SANDS (ML/SM): brown to dark brown, ~1.0' layers.
		SM				SILTY SAND (SM): brown, medium grained, saturated.
20						SILTY SAND (SM): brown, medium grained, saturated.
						SILTY SAND (SM): brown to gray, fine grained, moist.
						SILTY SAND/SANDY SILT (SM): brown, moist to wet.
		ML				SILT (ML): brown, dense, slightly moist.

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BOREHOLE LOG

Project Number: 5223.00
Project Name: Atofina Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: GeoTechnical Exploration Inc.
Drilling Method: Hollow Stem Auger
Logged By: Brian Magee
Date(s): 05/30/03
Initial Water Level: 15.00'

Total Depth: 30.00'
Completed Depth: 30.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 10.00'
type: Stainless Steel Blank dia: 2.00in fm: 10.0' to: 20.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 20.00' to: 30.00'

Annular Fill:
type: Grout fm: 0.00' to: 16.00'
type: Bentonite fm: 16.00' to: 19.00'
type: #10-20 Sand Filter fm: 19.00' to: 30.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		SM				SILTY SAND (SM): brown, medium grained, moist.
						SILTY SAND (SM): as above, moist to wet.
						SILTY SAND (SM): as above, some very thin silt stringers.
						SILTY SAND (SM): as above, some very thin silt stringers.
		SM/ML				SILTY SAND/SANDY SILT (SM/ML): brown, fine grained sand, silt layers to ~1.0" thick.
30		ML				SILT (ML): brown, dense, low plasticity, moist.
						Total Depth – 30.0' bgs
35						
40						
45						

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BOREHOLE LOG

Project Number: 5223.00
Project Name: Atofina Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Tacoma Pump and Drill
Drilling Method: Cable Tool
Logged By: Brian Magee
Date(s): 05/27/03–05/29/03
Initial Water Level: NA
Borehole Dia.: 12.00in, 8.00in

Total Depth: 38.00'
Completed Depth: 37.50'

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 12.00'
type: Stainless Steel Blank dia: 2.00in fm: 12.0' to: 32.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 32.00' to: 37.50'

Annular Fill:
type: Concrete fm: 0.00' to: 1.00'
type: Grout fm: 1.00' to: 29.50'
type: Bentonite Chips fm: 29.50' to: 31.50'
type: #10-20 Sand Filter fm: 31.50' to: 37.50'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		GM				SILTY SANDY GRAVEL (GM): well graded, mostly vesicular basalt gravel.
5					65 60 33	SILTY SANDY GRAVEL (GM): bits of asphalt and brick.
10					10 30 70	GRAVEL (GM): variegated colors: red, white, black, gravel to 1.0", well graded.
15		GW			11 18 20	SANDY GRAVEL (GW): fractured gravel, well graded.
20		SM			13 17 18 23	SILTY SAND (SM): yellowish, reddish brown, medium grained.
		GM			53	SILTY SANDY GRAVEL (GM)
		SM			35 42 60	SILTY SAND (SM): yellowish brown sand, black spots within sand.
					23	Large wood fragments at top.
		GM			80	SILTY SANDY GRAVEL (GM): well graded, fractured.

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BOREHOLE LOG

Project Number: 5223.00
Project Name: Atofina Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Tacoma Pump and Drill
Drilling Method: Cable Tool
Logged By: Brian Magee
Date(s): 05/27/03–05/29/03
Initial Water Level: NA
Borehole Dia.: 12.00in, 8.00in

Total Depth: 38.00'
Completed Depth: 37.50'

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 12.00'
type: Stainless Steel Blank dia: 2.00in fm: 12.0' to: 32.00'

Screens:
type: Stainless Steel Type 304 size: 0.010in dia: 2.00in fm: 32.00' to: 37.50'

Annular Fill:
type: Concrete fm: 0.00' to: 1.00'
type: Grout fm: 1.00' to: 29.50'
type: Bentonite Chips fm: 29.50' to: 31.50'
type: #10–20 Sand Filter fm: 31.50' to: 37.50'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Blow Counts	Description/Soil Classification
		SM			6	SILTY SAND (SM): coarse grained.
					12	
					15	SILTY SAND (SM): brown, fine to medium grained.
					17	
					5	SILTY SAND (SM): brown, fine grained.
					6	SILTY SAND (SM): brown, medium grained, interbedded with two 1.0" gray silt layers with fine grained sand.
					5	
30					7	SILTY SAND (SM): brown, medium grained.
		ML			3	SILT (ML): gray, some brown mottling, some fine grained sand.
					3	
					6	
					10	
		SP				SAND (SP): yellowish, reddish brown, medium grained.
					4	SAND (SP): as above
					7	
					13	
35					50-3"	
					3	SAND (SP): as above
		ML			3	SILT (ML): gray, some fine grained sand, slightly stiff.
		SP			6	SAND (SP): yellowish, reddish brown, medium grained.
		ML			3	SILT (ML): gray, some fine grained sand, slightly stiff.
					3	
					6	
						Total Depth – 38.0' bgs
40						
45						

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BOREHOLE LOG

Project Number: 5226.60
Project Name: ATOFINA Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: T. Browning
Date(s): 11/20/03
Initial Water Level: 28.00'

Total Depth: 35.00'
Completed Depth: 33.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 23.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 23.00' to: 33.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite fm: 18.00' to: 21.00'
type: Sand Filter fm: 21.00' to: 35.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	% Recovery	Description/Soil Classification
						Asphalt/Gravel Base.
		SM				SILTY SAND (SM): dark brown, medium to coarse grained, medium dense, moist.
5					11	
		ML				SILT (ML): black, trace fine grained sand, moist.
10					44	
15					88	SILT (ML): dark greenish gray, with interbedded fine to medium grained sand, moist to wet.
		SM				SILTY SAND (SM): dark greenish gray, fine grained, medium dense, moist to wet.
20					83	SILTY SAND (SM): as above, dark brown, fine to coarse grained.
					78	
					72	

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BOREHOLE LOG

Project Number: 5226.60
Project Name: ATOFINA Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: T. Browning
Date(s): 11/20/03
Initial Water Level: 28.00'

Total Depth: 35.00'
Completed Depth: 33.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 23.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 23.00' to: 33.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite fm: 18.00' to: 21.00'
type: Sand Filter fm: 21.00' to: 35.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	% Recovery	Description/Soil Classification
					89	
					44	
					78	SILTY SAND (SM): as above, wet.
30					100	
					100	
					100	
					100	
35						Total Depth – 35.0' bgs
40						
45						

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BOREHOLE LOG

Project Number: 5226.60
Project Name: ATOFINA Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: T. Browning
Date(s): 11/20/03
Initial Water Level: 28.75'

Total Depth: 34.00'
Completed Depth: 33.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 23.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 23.00' to: 33.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite fm: 18.00' to: 21.00'
type: Sand Filter fm: 21.00' to: 34.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	% Recovery	Description/Soil Classification
		SM				SAND/GRAVEL (6.0") SILTY SAND (SM): dark brown, medium grained, medium dense, moist.
5					67	
		ML				SILT (ML): black, with medium to coarse grained sand, firm, moist.
10					78	
						SILT (ML): as above, soft.
15					56	
		SM				SILTY SAND (SM): dark brown, fine to coarse grained, dense, moist.
20					83	
						SILTY SAND (SM): as above, medium dense.

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BOREHOLE LOG

Project Number: 5226.60
Project Name: ATOFINA Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: T. Browning
Date(s): 11/20/03
Initial Water Level: 28.75'

Total Depth: 34.00'
Completed Depth: 33.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 23.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 23.00' to: 33.00'

Annular Fill:
type: Grout fm: 0.00' to: 18.00'
type: Bentonite fm: 18.00' to: 21.00'
type: Sand Filter fm: 21.00' to: 34.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	% Recovery	Description/Soil Classification
					72	
					89	
		▽			89	SILTY SAND (SM): as above, wet.
30					100	
					100	
					94	Total Depth – 34.0' bgs
35						
40						
45						

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BOREHOLE LOG

Project Number: 5226.60
Project Name: ATOFINA Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: T. Browning
Date(s): 11/21/03
Initial Water Level: 27.50'

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 0.00' to: 17.00'
type: Bentonite fm: 17.00' to: 20.00'
type: Sand Filter fm: 20.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	% Recovery	Description/Soil Classification
						Top 1.0', concrete and gravel base.
		SM				SILTY SAND (SM): brown, fine to coarse grained, medium dense, laminated with brown silt, moist.
5					94	
10					89	
		ML				SILT (ML): dark greenish gray, soft, wet.
15		SM			56	SILTY SAND (SM): dark brown, fine to coarse grained, medium dense, moist.
20					83	
					66	SILTY SAND (SM): as above, dense.
					89	
						SILTY SAND (SM): as above, medium dense.

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BOREHOLE LOG

Project Number: 5226.60
Project Name: ATOFINA Chemicals – Monitoring Well Installation
Location: Portland, Oregon
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Logged By: T. Browning
Date(s): 11/21/03
Initial Water Level: 27.50'

Total Depth: 32.00'
Completed Depth: 32.00'
Borehole Dia.: 10.00in

Blank Casing:
type: Sch 40 PVC dia: 2.00in fm: 0.0' to: 22.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 22.00' to: 32.00'

Annular Fill:
type: Grout fm: 0.00' to: 17.00'
type: Bentonite fm: 17.00' to: 20.00'
type: Sand Filter fm: 20.00' to: 32.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	% Recovery	Description/Soil Classification
					100	
					89	SILTY SAND (SM): as above, wet.
					89	
30					94	
					100	SILTY SAND (SM): dark grayish brown, fine to coarse grained, loose.
						Total Depth – 32.0' bgs
35						
40						
45						

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BOREHOLE LOG

Site Id: CS-1

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 8.00'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
		SM					Gravel. SILTY SAND (SM): brown, medium grained, lightly banded silts.
				0.3			
				8.1			
				0.8			
				0.0			
							No recovery.
5		SM		0.2			SILTY SAND (SM): brown and yellow, fine to medium grained.
				0.0			
				0.0			
				0.4			
				0.8			
				0.3		CS-1-7.5	
							Total Depth – 8.0' bgs
10							

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BOREHOLE LOG

Site Id: CS-2

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 9.25'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.0			Gravel.
		SM		0.0			SILTY SAND (SM): medium grained, finely banded silts.
				0.0			
				0.0			
							No recovery.
5		SM		15.0			SILTY SAND (SM): brown to tan, medium grained, dry.
				12.4			
				18.2			
				76.4			
				98.6			SILTY SAND (SM): tan, fine grained, oily sheen, strong odor.
				>500		CS-2-8.0	
		ML		72.0			SILT (ML): brown, dense.
		SP		68.4			SAND (SP): gray, fine grained.
10							Total Depth – 9.25' bgs

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BOREHOLE LOG

Site Id: CS-3

Project Number: 4395.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Direct Push

Borehole Dia.: 2.00in
Total Depth: 10.00'
Initial Water Level: Not Available
Logged By: B. Magee
Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.0			Gravel.
				0.0			
		SP		5.4			SAND (SP): brown, medium grained, moist.
							No recovery.
5		SM		82.2			SILTY SAND (SM): tan, very silty, moist.
				126.4			
				258			
				~6000			SILTY SAND (SM): strong oily sheen, strong odor, very moist.
				~7500		CS-3-8.0	
				~1200			
		ML		800			SILT (ML): brown, slightly plastic, dense.
		SM		400			SILTY SAND (SM): tan.
10							Total Depth – 10.00' bgs

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BOREHOLE LOG

Site Id: CS-4

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 7.50'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
		SP					Gravel.
				28.1			SAND (SP): brown to reddish brown, medium grained, slightly moist.
				19.2			SAND (SP): gray to tan, medium grained, silty in thin bands, slightly moist.
				18.6			No recovery.
5		SM		26.4			SILTY SAND (SM): tan, fine grained, slight odor, slightly moist.
				126.4			
				986			
		ML		~7000		CS-4-7.0	SILTY SAND (SM): tan, oily sheen, very strong odor.
				412			SILT (ML): brown, dense.
							Total Depth – 7.50' bgs
10							

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BOREHOLE LOG

Site Id: CS-5

Project Number: 4395.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Direct Push

Borehole Dia.: 2.00in
Total Depth: 9.00'
Initial Water Level: Not Available
Logged By: B. Magee
Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.0			Gravel.
		SP		0.0			SAND (SP): brown and tan, medium grained, dry.
				0.0			
		SM		0.0			SILTY SAND (SM): brown, medium grained.
				0.0			No recovery.
5		SM					SILTY SAND (SM): brown, very silty, slightly moist.
				0.0			
				0.0			
				0.0		CS-5-8.0	SILTY SAND (SM): brown, very silty, moist.
		ML		0.0			SILT (ML): brown.
							Total Depth – 9.00' bgs
10							

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BOREHOLE LOG

Site Id: CS-6

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 8.50'

Initial Water Level: 5.00'

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.0			Gravel.
		SP					SAND (SP): brown, medium grained.
				1.6			
				0.0			
							No recovery.
5		SM	▽				SILTY SAND (SM): brown, fine grained, wet.
				84.2			
				116			
				340			
		ML		256			SANDY SILT (ML): tan to gray, very fine grained, notable odor.
				780		CS-6-8.0	
							Total Depth – 8.50' bgs
10							

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BOREHOLE LOG

Site Id: CS-7

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 8.50'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.0			Gravel.
		SM		0.6			SILTY SAND (SM): tan, slight reddish brown bands.
				1.4			No recovery.
5		ML		18.4			SANDY SILT (ML): tan, fine grained.
				238			
				760		CS-7-8.0	SANDY SILT (ML): tan, fine grained, strong odor. Total Depth – 8.50' bgs
10							

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BOREHOLE LOG

Site Id: CS-8

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 10.00'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
		SP		0.0			Gravel.
							SAND (SP): reddish brown, medium grained.
				0.0			SAND (SP): tan, medium grained.
				0.8			
		SM		0.6			SILTY SAND (SM): tan, some yellowish coloration, fine silt bands.
							No recovery.
5		SM					SILTY SAND (SM): gray, very silty, very fine grained.
				80.2			
				404			
				5287		CS-8-7.5	Thin 1.0" bands of black material, possibly organics, very strong odor.
				689			
10				423			Total Depth – 10.00' bgs

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BOREHOLE LOG

Site Id: CS-9

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 9.00'

Initial Water Level: 5.00'

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
							Gravel.
				0.0			
		SP					SAND (SP): tan with speckled black and white, medium grained.
				0.0			
				0.0			
		SM		0.0			SILTY SAND (SM): gray with tan thin bands, fine grained.
							No recovery.
5		SM	▽				SILTY SAND (SM): tan, wet.
				0.0			
				0.0			
				0.0		CS-9-8.0	
							Total Depth – 9.00' bgs
10							

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BOREHOLE LOG

Site Id: CS-10

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 9.00'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				8.4			Gravel.
		SM		16.7			SILTY SAND (SM): brown to gray.
				54.4			SILTY SAND (SM): brown to gray, slight odor noted.
							No recovery.
5		SM		34.9			SILTY SAND (SM): gray with yellow bands, fine grained, moist.
				182			
				405			
				792		CS-10-8.0	Strong odor from ~8.0' to bottom of sample.
				501			Total Depth – 9.00' bgs
10							

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BOREHOLE LOG

Site Id: CS-11

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 8.00'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
							Gravel.
		SM		0.8			SILTY SAND (SM): brown.
				0.4			SILTY SAND (SM): gray, fine bands of red and yellow silt.
				0.4			
							No recovery.
5		SM					SILTY SAND (SM): as above.
				64.2			
				189			Notable odor in soil.
				256		CS-11-8.0	Total Depth – 8.00' bgs
10							

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BOREHOLE LOG

Site Id: CS-12

Project Number: 4395.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Direct Push

Borehole Dia.: 2.00in
Total Depth: 9.00'
Initial Water Level: 2.00'
Logged By: B. Magee
Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
							Gravel.
		SP	▽				SAND (SP): brown, slightly silty, wet.
							No recovery.
5		SP					SAND (SP): as above.
						CS-12-8.0	Notable odor in soil.
							Total Depth – 9.00' bgs
10							Note: PID batteries died after previous boring. No data collected for this boring.

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BOREHOLE LOG

Site Id: CS-13

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 9.75'

Initial Water Level: Not Available

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.0			Gravel.
		SM		0.0			SILTY SAND (SM): brown, fine grained, dry.
				6.2			No recovery.
		SM		98.4			SILTY SAND (SM): brown, strong odor, slightly moist.
5				113			
				230			No recovery.
		ML		7500			SILT (ML): brown, with fine grained sand.
				>7000		CS-13-8.5	DNAPL verified with Sudan IV dye.
				700			Total Depth – 9.75' bgs
10							

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BOREHOLE LOG

Site Id: CS-14

Project Number: 4395.00

Project Name: ATOFINA Chemicals, Inc.

Location: Portland, Oregon

Contractor: GeoTech

Drilling Method: Direct Push

Borehole Dia.: 2.00in

Total Depth: 12.00'

Initial Water Level: 4.50'

Logged By: B. Magee

Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.3			Asphalt.
				0.6			Gravel fill.
		SP		1.3			SAND (SP): red stained, fine to medium grained.
		SM		0.6			SILTY SAND (SM): gray, moist.
		SP		0.6			SAND (SP): gray, medium grained, moist.
		SM					SILTY SAND (SM): gray, fine grained, moist.
							No recovery.
		SP	▽	8.4			Gravel slough.
							SAND (SP): gray with slight pink tint, medium grained, wet.
5				11.6			
		SM					SILTY SAND (SM): gray with pink tint, wet.
				13.6			
				11.8			
							Gravel slough.
				8.4			SILTY SAND (SM): gray with pink tint, saturated.
				9.2			
				10.1			
		ML					SILT (ML): gray, wet.
10				18.4			
		SM					SILTY SAND (SM): brown to red tint, strong odor (MCB).
				16			SILTY SAND (SM): red, strong odor.
				43		CS-14-11.0	
		ML					SILT (ML): yellow and brown banding.
				38			
							Total Depth – 12.00' bgs

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BOREHOLE LOG

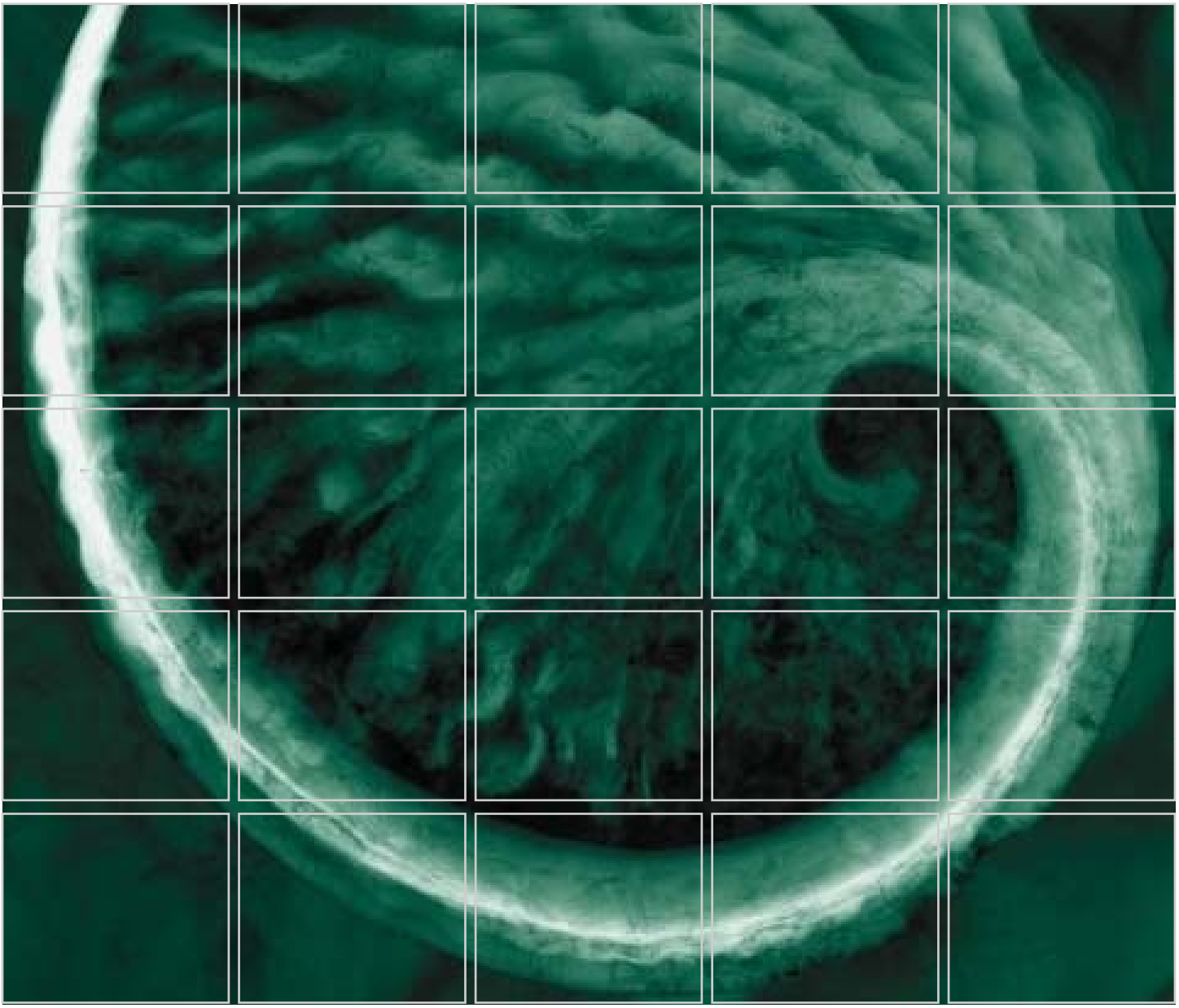
Site Id: CS-15

Project Number: 4395.00
Project Name: ATOFINA Chemicals, Inc.
Location: Portland, Oregon
Contractor: GeoTech
Drilling Method: Direct Push

Borehole Dia.: 2.00in
Total Depth: 9.00'
Initial Water Level: Not Available
Logged By: B. Magee
Date(s): 05/08/03

Depth (ft)	Graphic Log	USCS Code	Water Level	PID (ppm)	Sample Interval	Sample No.	Soil Description and Observations
				0.0			Gravel.
		SP		0.0			SAND (SP): brown, medium to coarse grained, with finely banded silt.
				0.0			
				0.3			
				0.0			SAND (SP): tan to gray, fine to medium grained.
				0.0			
							No recovery.
5		SP		0.6			SAND (SP): brown, medium grained, moist.
				0.8			
		SM		0.3			SILTY SAND (SM): yellow.
				0.0			
				0.8			
		ML		0.6		CS-15-7.5	SANDY SILT (ML): yellow, moist.
		SM		0.0			SILTY SAND (SM): gray.
							Total Depth – 9.00' bgs
10							

Appendix I
Old Caustic Tank Farm Report



Soil Sampling and Analysis Report
Old Caustic Tank Farm

ATOFINA Chemicals, Inc. Facility
Portland, Oregon

20 July 2004

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(503) 542-8017 (fax)

20 July 2004

Mr. Larry Patterson, P.E.
Environmental Manager
ATOFINA Chemicals, Inc.
6400 N.W. Front Avenue
Portland, Oregon 97210

Subject: Soil Sampling and Analysis Report
Old Caustic Tank Farm
ATOFINA Chemicals, Inc. Portland Facility

Dear Larry:

ERM-West Inc. (ERM) has prepared this Soil Sampling and Analysis Report on behalf of ATOFINA Chemicals, Inc., (ATOFINA Chemicals) to present the results of soil sampling activities conducted in the Old Caustic Tank Farm (OCTF) area at the ATOFINA Chemicals facility in Portland, Oregon (Figure 1). The purpose of this soil investigation was to supplement existing remedial investigation data. This work was conducted in accordance with the *Old Caustic Tank Farm Soil Sampling and Analysis Work Plan* (OCTF Work Plan) dated 8 December 2003, and relevant procedures outlined in the *Remedial Investigation and Feasibility Study Work Plan* (Exponent 1998). The OCTF Work Plan was conditionally approved by Oregon Department of Environmental Quality (ODEQ) in a letter dated 12 February 2004. This letter approved the OCTF Work Plan and requested additional sample collection and analysis. The requested additional sampling and analysis activities were conducted and are described herein.

BACKGROUND

The ATOFINA Chemicals facility is located at 6400 NW Front Avenue in the Northwest Industrial Area of Portland, Oregon. The chlor-alkali plant operated as a chemical manufacturing facility for over 50 years

until 2001. The plant is no longer in operation and is currently being decommissioned.

The OCTF area is located towards the south end of the Acid Plant area at the ATOFINA Chemicals facility. The OCTF area formerly contained seven, 281,000-gallon aboveground storage tanks (ASTs), each measuring 34 feet in diameter, and two, 122,000-gallon ASTs, each measuring 16 feet in diameter. All of these tanks were made of steel. Historically, there was a network of small-diameter piping under each tank that allowed the injection of petroleum materials into the soil to prevent external corrosion on the tank bottoms. The tanks and piping have been removed.

In January 2002, a composite soil sample was collected from beneath the base of a tank removed from the northeastern corner of the OCTF area. Soil was collected from seven different locations from the base of the tank and submitted as a composite sample for laboratory analysis of total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs). Petroleum hydrocarbons were detected in the sample. No PCBs were detected. Based on the results of this preliminary investigation, ATOFINA Chemicals proposed that additional soil sampling be conducted to characterize soil conditions below each of the nine former ASTs in the OCTF area.

SCOPE OF WORK

The first round of sample collection in the OCTF area was conducted on 27 and 28 January 2004. Two composite soil samples were collected from the base of each of the nine former tanks. The first sample was a composite of three discrete samples collected from the top 6 inches of soil within the footprint of each former tank base (Figure 2). The second composite sample was a composite from the same three discrete locations at a depth of 12 inches below ground surface (bgs). The following analyses were conducted on these composite samples:

- TPH as diesel and heavy oil by Washington State Department of Ecology Method NWTPH-Dx;

- Volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260;

- PCBs by USEPA Method 8082; and

- Organochlorine pesticides (DDD, DDE, and DDT) by USEPA Method 8081.

Table 1 provides a summary of sample numbers and the analyses for which each sample was analyzed.

In addition to the 18 composite samples collected from the former tank locations, eight discrete soil samples were collected from four locations within the OCTF area – two samples were collected at each location – from depths of 6 and 12 inches bgs (Figure 2). These samples were collected to characterize soil within the OCTF area but outside the footprints of the tanks. Each of these eight samples was analyzed for only organochlorine pesticides (DDD, DDE, and DDT) by USEPA Method 8081 (Table 1).

Following completion of the 27 and 28 January soil sampling effort, ATOFINA Chemicals received a letter from the ODEQ, dated 12 February 2004, requesting additional analyses beyond those specified in the OCTF Work Plan. Specifically, the letter stated, "Analyze a split sample from three of the soil samples for cadmium, chromium, lead, polynuclear aromatic hydrocarbons (PAHs), VOCs (i.e., USEPA Method 8260), and hydrocarbon fractions. The [additional] samples should be [collected] from higher diesel/oil impacted samples and should be geographically representative of the tank farm area."

Based on this request and our review of analytical results for the initial 18 tank foundation composite samples, locations OCTF-1, OCTF-3, and OCTF-9 were selected for the additional sampling and analyses. ERM collected the additional samples on 6 April 2004. The samples were collected in the same composite manner and from the same depths as the previous samples (i.e., each composite sample was comprised of soil from three discrete sampling locations, with one composite sample from 6 inches bgs and one composite sample from 12 inches bgs). The additional samples were analyzed for all analyses requested by ODEQ, with the exception of VOCs, which had already been analyzed in the initial sampling effort. Table 1 provides a summary of analytical methods used for these additional analyses.

Sample Collection Procedures

All soil samples were collected using a hand-auger. Composite samples were collected by mixing soil from each of three discrete sampling locations in a stainless steel bowl and sampling from the mixture. Soil samples were placed in laboratory-supplied glass jars. All non-disposable sampling equipment was decontaminated prior to use and between sample locations. Sampling equipment was scrubbed with an aqueous solution of laboratory-grade detergent (e.g., Alconox), followed by a rinse with tap water, followed by a rinse with isopropyl alcohol or methanol, followed by a rinse with de-ionized water. To avoid cross contamination between samples, disposable sampling equipment was discarded and replaced between each sample location.

RESULTS

Dark petroleum oil-type staining was observed on the surface and within the soil matrix at most sample locations. Low petroleum hydrocarbon-type odor was noted in soil from a few sample locations, and most notably at OCTF-3. The results of the soil sampling investigation are summarized in Tables 2, 3, and 4. Selected results are depicted in Figures 2, 3, and 4. Laboratory analytical reports are included in Attachment 1.

TPH (diesel- and/or heavy oil-range) was detected in 17 of the 18 composite samples collected. The highest detected concentrations of TPH as diesel and heavy oil were in sample OCTF-1-0.5 at concentrations of 2,840 and 4,750 milligrams per kilogram (mg/kg), respectively (Table 2, Figure 2). The highest concentrations detected for TPH in the volatile petroleum hydrocarbon (VPH) and extractable petroleum hydrocarbon (EPH) fraction samples was EPH Aliphatics C10-C34 for the same sample (OCTF-1-0.5). This petroleum hydrocarbon range is consistent with weathered oil. All detections for TPH as diesel and heavy oil were well below ODEQ Generic Soil TPH Risk-Based Concentrations (RBCs) for occupational and construction worker scenarios.

One or more PAHs were detected in all six of the samples for which they were analyzed (Table 3). All detected PAH concentrations were below their ODEQ Generic Soil RBCs for occupational and construction worker scenarios, as well as their ODEQ Precalculated Hot-Spot Levels for soil. With the exception of benzo(a)pyrene, all detected PAH concentrations

were below their respective USEPA Region 9 Preliminary Remediation Goals (PRGs) and ODEQ Generic Soil RBCs. The presence of PAHs in these samples is typical of soil with TPH impacts.

One VOC (1,2,4-trimethylbenzene) was detected in one of the 18 samples (sample number OCTF-3-1.0) at a concentration of 0.125 mg/kg (Table 4). This concentration is well below all applicable regulatory screening levels. There were no PCBs detected in any of the soil samples (Table 4).

Of the three metals analyzed, chromium and lead were detected at low concentrations in all six samples, whereas cadmium was not detected in any of the six samples. Chromium and lead were detected at concentrations up to 17.8 mg/kg (OCTF-3-0.5) and 8.75 mg/kg (OCTF-9-1.0), respectively. These concentrations are less than ODEQ's default regional background concentrations and are well below all applicable regulatory screening levels (Table 4, Figure 3).

At least one of the organochlorine pesticides DDD, DDE, and DDT was detected in all 26 soil samples collected. Twenty-one of the 26 samples contained pesticides at concentrations below the USEPA Region 9 PRGs. The highest detections of DDD, DDE, and DDT were 360, 18,200, and 13,300 mg/kg, respectively. Both samples collected from OCTF-11-0.5 and OCTF-11-1.0 had high organochlorine pesticide detections. Pesticide detections in the other areas within the OCTF were significantly lower (Table 4, Figure 4).

CONCLUSIONS

The results of the investigation indicate that the oil used as a corrosion inhibitor at the base of each of the nine tank pads in the OCTF area has contributed to low concentrations of TPH in soil beneath the former tanks. These petroleum impacts appear to extend deeper than 1 foot bgs at each of the former tank pads, with the exception of location OCTF-8. None of the detected TPH concentrations exceed ODEQ's Generic Soil RBCs established for soil ingestion, dermal contact, and inhalation for occupational or construction worker scenarios.

The only PAH detected above the USEPA Region 9 PRG was benzo(a)pyrene. However, these PAH detections were all very low and well below the RBCs established for soil ingestion, dermal contact, and

inhalation for occupational and construction workers, which are the most probable exposure scenarios for these contaminants.

There were no indications that VOCs, PCBs, or metals represent a significant component of the petroleum impacts. There were no detections of these constituents above the RBCs for occupational or construction worker exposure. None of these constituents were detected above their respective PRGs for industrial soil.

Five soil samples contained one or more organochlorine pesticides above USEPA Region 9 PRGs. Two of the five samples contained DDE and DDT above their ODEQ Precalculated Hot Spot Values. None of the other 21 samples collected during this investigation have organochlorine pesticide detections greater than the USEPA Region 9 PRGs. This indicates that the area of pesticide impacts appears to be limited in extent. A complete hot spot evaluation in which this constituent will be considered will be performed as part of a future risk assessment and feasibility study for the ATOFINA Chemicals facility.

Thank you for the continued opportunity to work with ATOFINA Chemicals. If you have questions or require additional information, please contact Jason Kraus at (503) 542-8020 or Brian Magee at (425) 462-8591.

Sincerely,

Brian D. Magee
Project Geologist

Jason F. Kraus
Project Manager

BDM/JFK/dwb/5559.00
Attachments

cc: Mr. Doug Loutzenhiser/ATOFINA Chemicals, Inc.

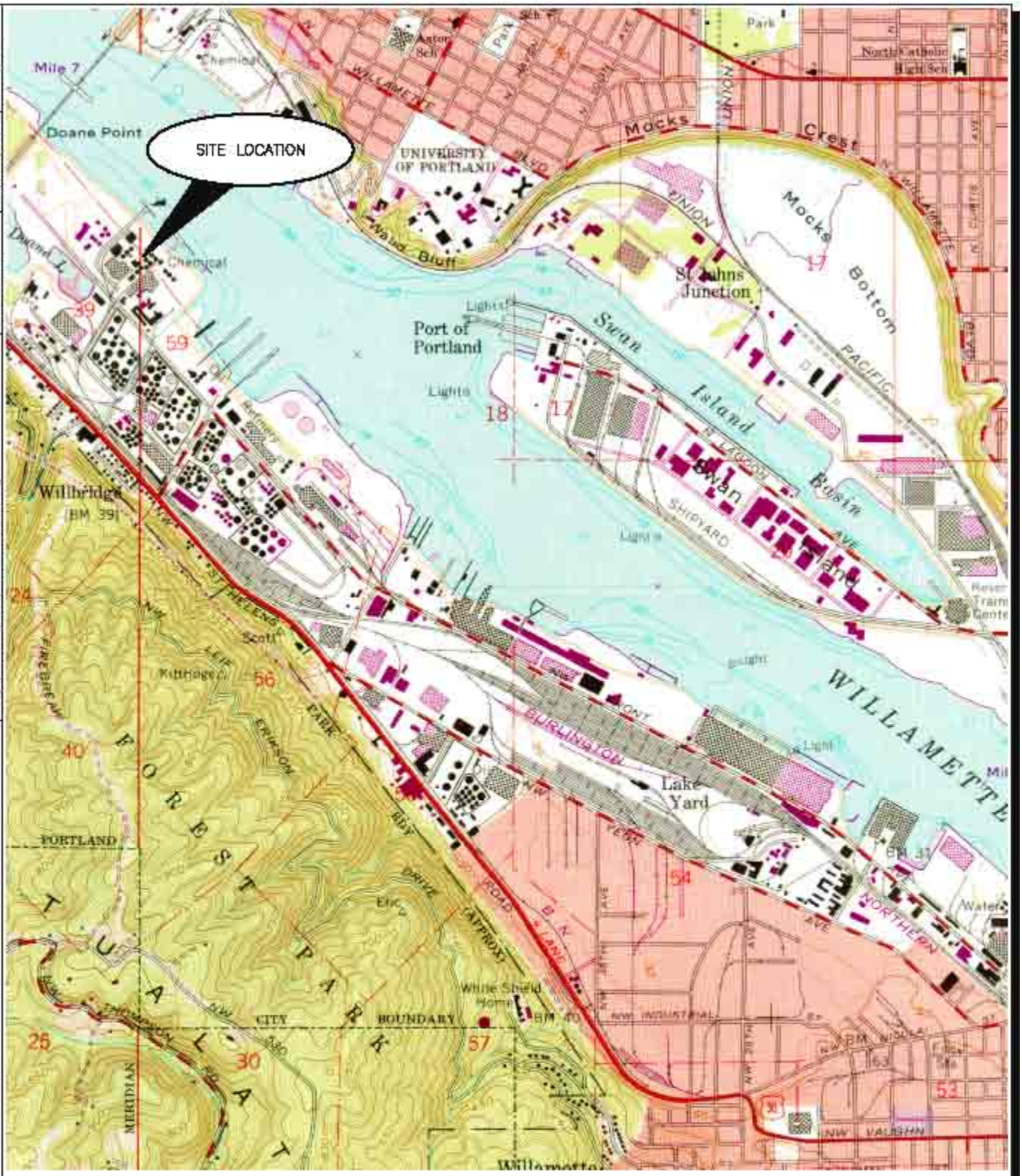
Figures

Project No. 4744.40

Date: 02/25/02

Drawn By: R. Olson

CAD File: G:\4744\40\4744001.dwg



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1 1/2 0 1 MILE

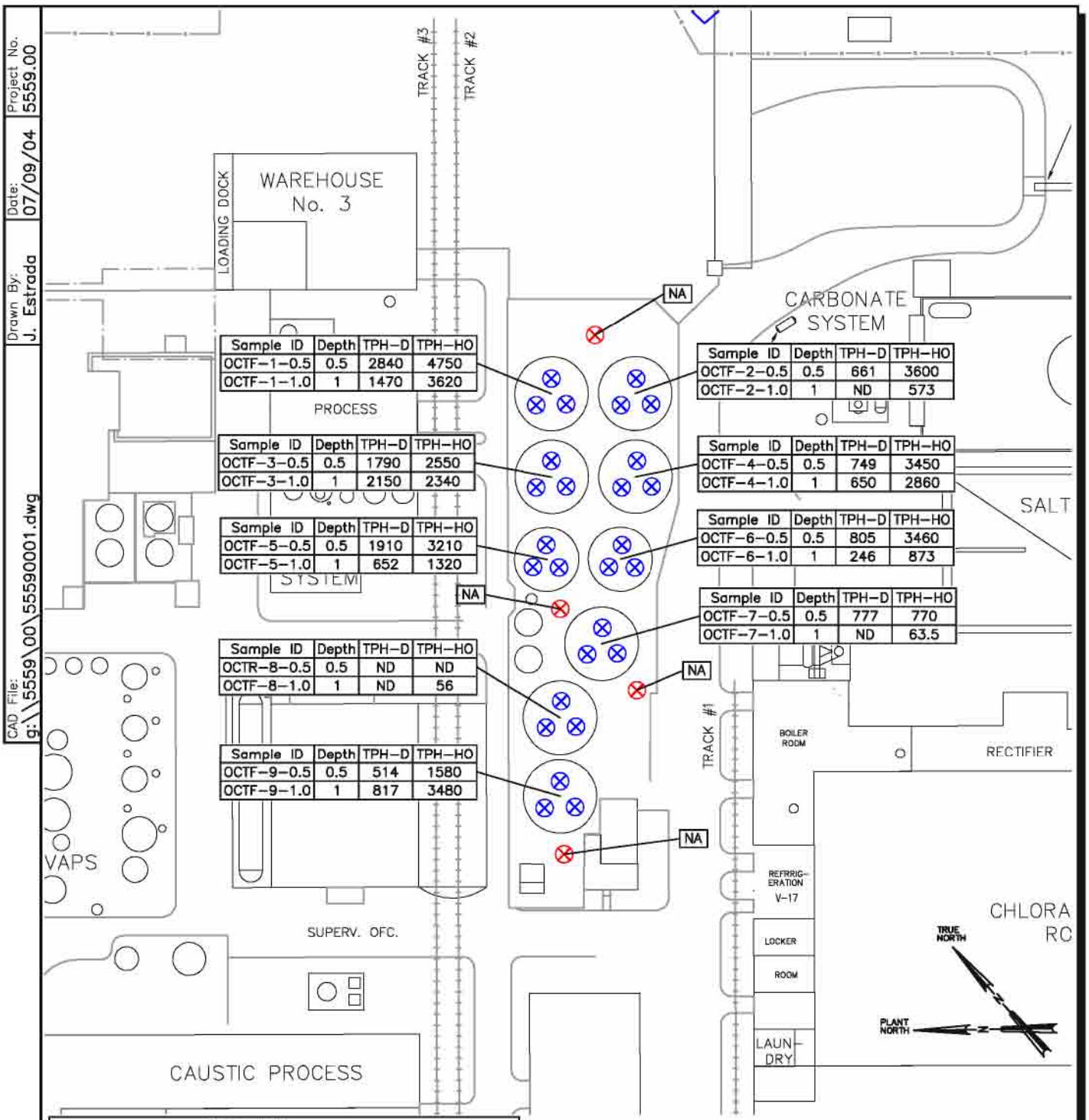
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

References:
U.S.G.S. 7.5 Minute Series (Topographic Portland, Oregon–Washington)
Dated: 1961; Photorevised 1970 and 1977

Figure 1
Site Location Map
ATOFINA Chemicals, Inc.
Portland, Oregon

BBM 02/02



Sample ID	Depth	TPH-D	TPH-HO
OCTF-1-0.5	0.5	2840	4750
OCTF-1-1.0	1	1470	3620

Sample ID	Depth	TPH-D	TPH-HO
OCTF-2-0.5	0.5	661	3600
OCTF-2-1.0	1	ND	573

Sample ID	Depth	TPH-D	TPH-HO
OCTF-3-0.5	0.5	1790	2550
OCTF-3-1.0	1	2150	2340

Sample ID	Depth	TPH-D	TPH-HO
OCTF-4-0.5	0.5	749	3450
OCTF-4-1.0	1	650	2860

Sample ID	Depth	TPH-D	TPH-HO
OCTF-5-0.5	0.5	1910	3210
OCTF-5-1.0	1	652	1320

Sample ID	Depth	TPH-D	TPH-HO
OCTF-6-0.5	0.5	805	3460
OCTF-6-1.0	1	246	873

Sample ID	Depth	TPH-D	TPH-HO
OCTF-7-0.5	0.5	777	770
OCTF-7-1.0	1	ND	63.5

Sample ID	Depth	TPH-D	TPH-HO
OCTR-8-0.5	0.5	ND	ND
OCTF-8-1.0	1	ND	56

Sample ID	Depth	TPH-D	TPH-HO
OCTF-9-0.5	0.5	514	1580
OCTF-9-1.0	1	817	3480

LEGEND

⊗ Discrete Soil Sample Location

⊗ Composite Soil Sample Location

TPH-D Total Petroleum Hydrocarbon as Diesel

TPH-HO Total Petroleum Hydrocarbon as Heavy Oil

ND Not Detected

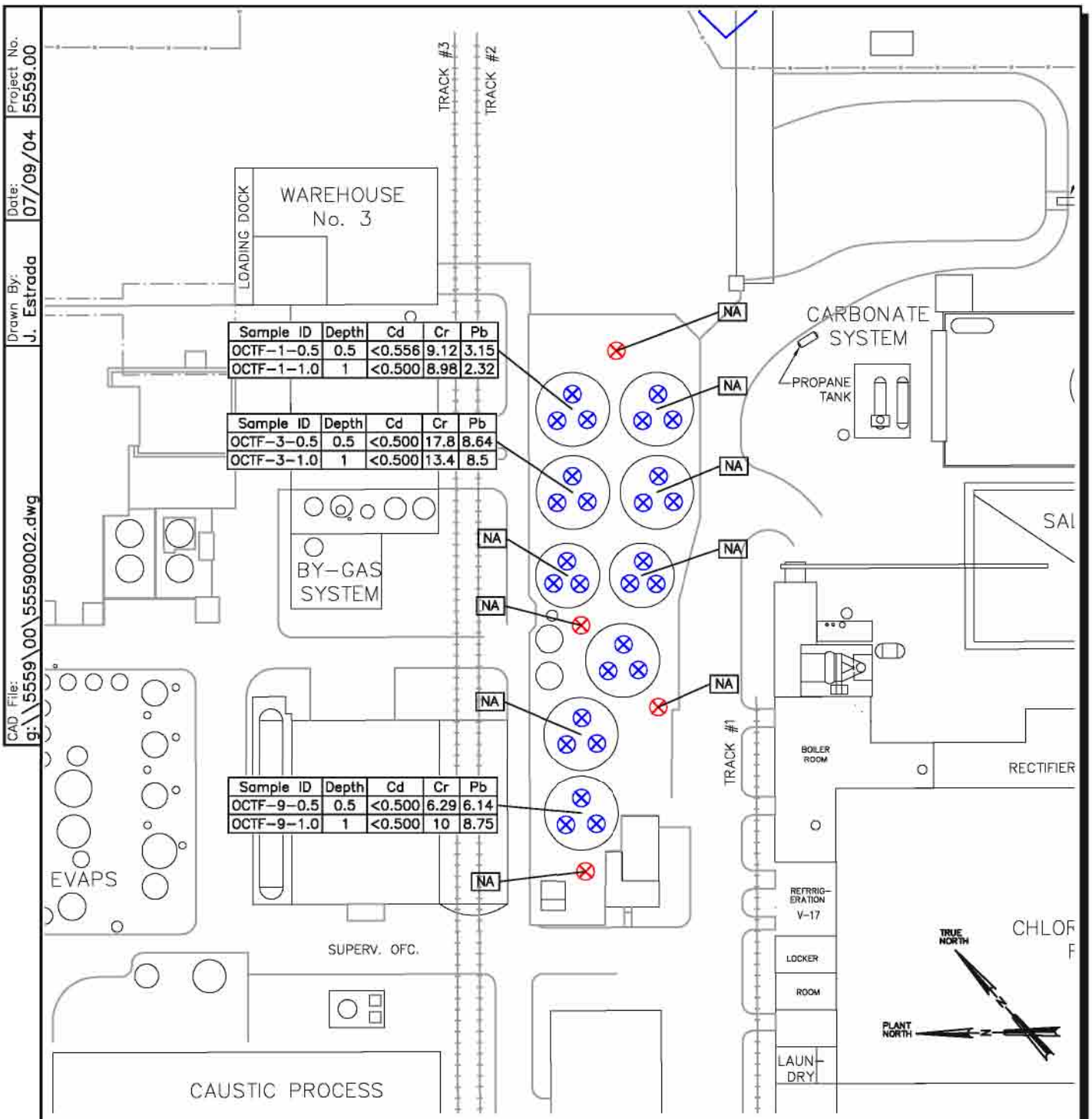
NA Not Analyzed for TPH

Notes:
Sample collection dates: 27 and 28 January 2004.
Concentrations are in mg/kg.
Depth of samples are feet below ground surface.

0 80
FEET

Figure 2
Summary of Total Petroleum Hydrocarbons Detected in Soil
Former Old Caustic Tank Farm
ATOFINA Chemicals, Inc.
Portland, Oregon

ERM 07/04



Sample ID	Depth	Cd	Cr	Pb
OCTF-1-0.5	0.5	<0.556	9.12	3.15
OCTF-1-1.0	1	<0.500	8.98	2.32

Sample ID	Depth	Cd	Cr	Pb
OCTF-3-0.5	0.5	<0.500	17.8	8.64
OCTF-3-1.0	1	<0.500	13.4	8.5

Sample ID	Depth	Cd	Cr	Pb
OCTF-9-0.5	0.5	<0.500	6.29	6.14
OCTF-9-1.0	1	<0.500	10	8.75

LEGEND

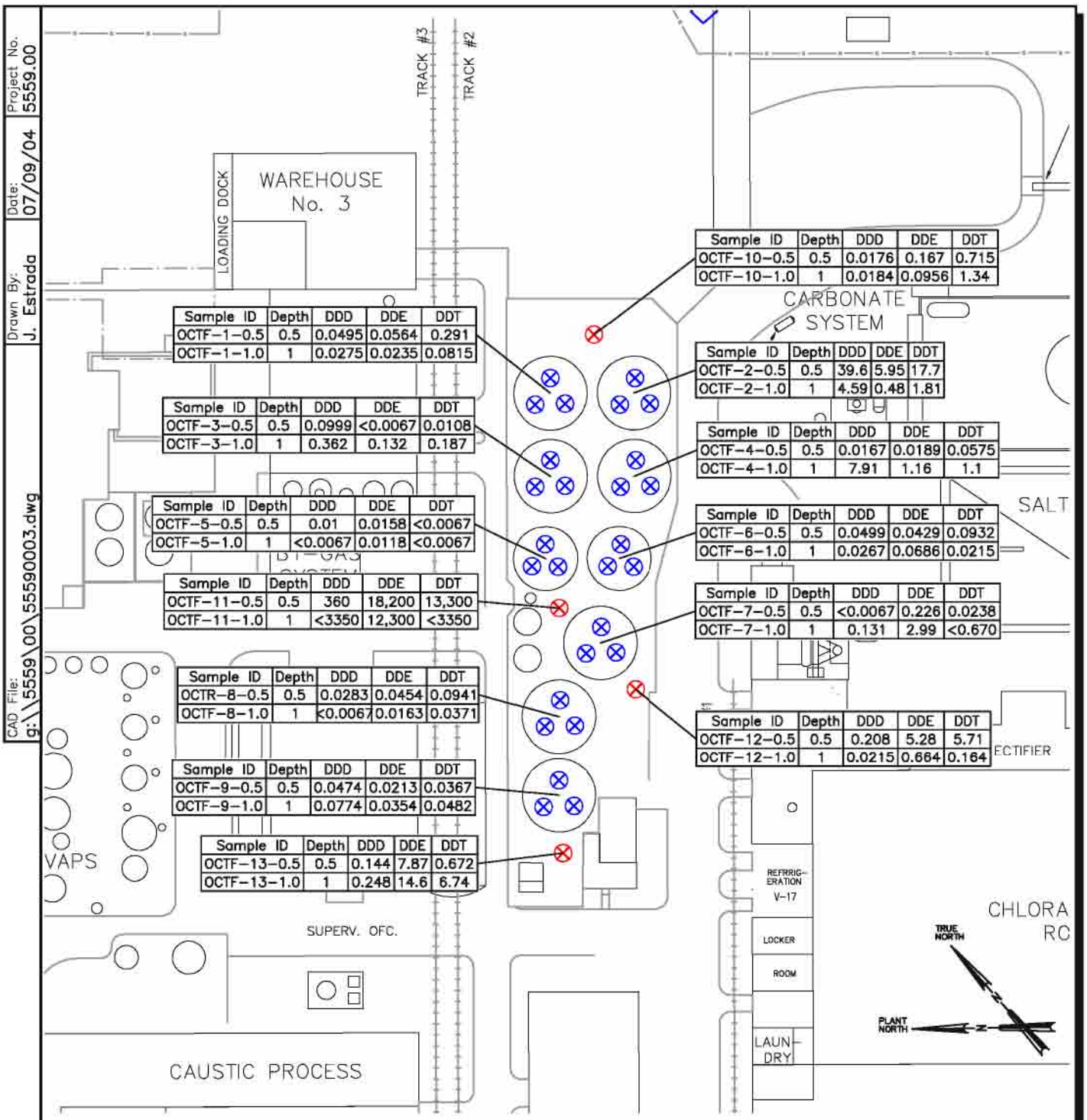
- ⊗ Discrete Soil Sample Location
- ⊗ Composite Soil Sample Location
- Cd Cadmium
- Cr Chromium
- Pb Lead
- NA Not Analyzed for Metals

Notes:
Sample collection date: 6 April 2004.
Concentrations are in mg/kg.
Depth of samples are feet below ground surface.

0 80
FEET

Figure 3
Summary of Metals Detected in Soil
Former Old Caustic Tank Farm
ATOFINA Chemicals, Inc.
Portland, Oregon

ERM 07/04



Sample ID	Depth	DDD	DDE	DDT
OCTF-1-0.5	0.5	0.0495	0.0564	0.291
OCTF-1-1.0	1	0.0275	0.0235	0.0815

Sample ID	Depth	DDD	DDE	DDT
OCTF-2-0.5	0.5	39.6	5.95	17.7
OCTF-2-1.0	1	4.59	0.48	1.81

Sample ID	Depth	DDD	DDE	DDT
OCTF-3-0.5	0.5	0.0999	<0.0067	0.0108
OCTF-3-1.0	1	0.362	0.132	0.187

Sample ID	Depth	DDD	DDE	DDT
OCTF-4-0.5	0.5	0.0167	0.0189	0.0575
OCTF-4-1.0	1	7.91	1.16	1.1

Sample ID	Depth	DDD	DDE	DDT
OCTF-5-0.5	0.5	0.01	0.0158	<0.0067
OCTF-5-1.0	1	<0.0067	0.0118	<0.0067

Sample ID	Depth	DDD	DDE	DDT
OCTF-6-0.5	0.5	0.0499	0.0429	0.0932
OCTF-6-1.0	1	0.0267	0.0686	0.0215

Sample ID	Depth	DDD	DDE	DDT
OCTF-11-0.5	0.5	360	18,200	13,300
OCTF-11-1.0	1	<3350	12,300	<3350

Sample ID	Depth	DDD	DDE	DDT
OCTF-7-0.5	0.5	<0.0067	0.226	0.0238
OCTF-7-1.0	1	0.131	2.99	<0.670

Sample ID	Depth	DDD	DDE	DDT
OCTR-8-0.5	0.5	0.0283	0.0454	0.0941
OCTF-8-1.0	1	<0.0067	0.0163	0.0371

Sample ID	Depth	DDD	DDE	DDT
OCTF-12-0.5	0.5	0.208	5.28	5.71
OCTF-12-1.0	1	0.0215	0.664	0.164

Sample ID	Depth	DDD	DDE	DDT
OCTF-9-0.5	0.5	0.0474	0.0213	0.0367
OCTF-9-1.0	1	0.0774	0.0354	0.0482

Sample ID	Depth	DDD	DDE	DDT
OCTF-13-0.5	0.5	0.144	7.87	0.672
OCTF-13-1.0	1	0.248	14.6	6.74

Sample ID	Depth	DDD	DDE	DDT
OCTF-10-0.5	0.5	0.0176	0.167	0.715
OCTF-10-1.0	1	0.0184	0.0956	1.34

LEGEND

⊗ Discrete Soil Sample Location

⊗ Composite Soil Sample Location

Notes:
Sample collection dates: 27 and 28 January 2004.
Concentrations are in mg/kg.
Depth of samples are feet below ground surface.

0 80
FEET

Figure 4
Summary of Organochlorine Pesticides Detected in Soil
Former Old Caustic Tank Farm
ATOFINA Chemicals, Inc.
Portland, Oregon

ERM 07/04

Tables

Table 1
Summary of Analytical Methods
Old Caustic Tank Farm Soil Sampling
ATOFINA Chemicals, Inc. Portland, Oregon

Sample ID	Collection Date	Depth (ft-bgs)	Sample Type	TPH-Diesel (NWTPH-Dx)	TPH-Heavy Oil (NWTPH-Dx)	VOCs (USEPA 8260)	PCBs (USEPA 8082)	Organichorine Pesticides (USEPA 8081)	TPH-VPH (NWTPH-VPH)	TPH-EPH (NWTPH-EPH)	PAHs (USEPA 8270 SIM)	Metals (USEPA 6020)	Odor Noted During Sampling?
OCTF-1-0.5	1/28/04	0.5	C	X	X	X	X	X	X*	X*	X*	X*	X
OCTF-1-1.0	1/28/04	1.0	C	X	X	X	X	X	X*	X*	X*	X*	X
OCTF-2-0.5	1/28/04	0.5	C	X	X	X	X	X					X
OCTF-2-1.0	1/28/04	1.0	C	X	X	X	X	X					X
OCTF-3-0.5	1/28/04	0.5	C	X	X	X	X	X	X*	X*	X*	X*	X
OCTF-3-1.0	1/28/04	1.0	C	X	X	X	X	X	X*	X*	X*	X*	X
OCTF-4-0.5	1/28/04	0.5	C	X	X	X	X	X					X
OCTF-4-1.0	1/28/04	1.0	C	X	X	X	X	X					X
OCTF-5-0.5	1/28/04	0.5	C	X	X	X	X	X					X
OCTF-5-1.0	1/28/04	1.0	C	X	X	X	X	X					X
OCTF-6-0.5	1/28/04	0.5	C	X	X	X	X	X					X
OCTF-6-1.0	1/28/04	1.0	C	X	X	X	X	X					X
OCTF-7-0.5	1/28/04	0.5	C	X	X	X	X	X					
OCTF-7-1.0	1/28/04	1.0	C	X	X	X	X	X					
OCTF-8-0.5	1/28/04	0.5	C	X	X	X	X	X					
OCTF-8-1.0	1/28/04	1.0	C	X	X	X	X	X					
OCTF-9-0.5	1/28/04	0.5	C	X	X	X	X	X	X*	X*	X*	X*	X
OCTF-9-1.0	1/28/04	1.0	C	X	X	X	X	X	X*	X*	X*	X*	X
OCTF-10-0.5	1/27/04	0.5	D					X					
OCTF-10-1.0	1/27/04	1.0	D					X					
OCTF-11-0.5	1/27/04	0.5	D					X					
OCTF-11-1.0	1/27/04	1.0	D					X					
OCTF-12-0.5	1/27/04	0.5	D					X					
OCTF-12-1.0	1/27/04	1.0	D					X					
OCTF-13-0.5	1/27/04	0.5	D					X					
OCTF-13-1.0	1/27/04	1.0	D					X					

Notes:
C = Composite sample
D = Discrete sample
EPH = Extractable Petroleum Hydrocarbons
ft-bgs = Feet below ground surface
PAHs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
TPH = Total Petroleum Hydrocarbons
USEPA = United States Environmental Protection Agency
VOCs = Volatile Organic Compounds
VPH = Volatile Petroleum Hydrocarbons
X = Sample was analyzed for this analyte; X* = Sample collection date = 6 April 2004
Metals analyses include Cadmium, Chromium, and Lead

Table 2
Petroleum Hydrocarbons in Soil
Old Caustic Tank Farm Soil Sampling
ATOFINA Chemicals, Inc. Portland, Oregon

Sample ID	Collection Date	Depth (ft-bgs)	TPH-Diesel	TPH-Heavy Oil	TPH-VPH					TPH-EPH							
					Aliphatics C5-C6	Aliphatics C6-C8	Aliphatics C8-C10	Aromatics C8-C10	Aromatics C12-C13	Aliphatics C10-C12	Aliphatics C12-C16	Aliphatics C16-C21	Aliphatics C21-C34	Aromatics C10-C12	Aromatics C12-C16	Aromatics C16-C21	Aromatics C21-C34
OCTF-1-0.5	1/28/04	0.5	**2,840**	**4,750**	<5.00	<5.00	<5.00	<5.00	**7.62**	<40	**230**	**799**	**2,960**	<40	<40	**195**	**1,270**
OCTF-1-1.0	1/28/04	1.0	**1,470**	**3,620**	<5.00	<5.00	<5.00	<5.00	<5.00	<20	**171**	**623**	**2,370**	<20	<20	**359**	**797**
OCTF-2-0.5	1/28/04	0.5	**661**	**3,600**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-2-1.0	1/28/04	1.0	ND	**573**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-3-0.5	1/28/04	0.5	**1,790**	**2,550**	<5.00	<5.00	<5.00	**19.0**	**95.7**	**53.3**	**277**	**207**	**691**	<10.0	**119**	**317**	**804**
OCTF-3-1.0	1/28/04	1.0	**2,150**	**2,340**	<10.0	<10.0	<10.0	**23.3**	**195**	**123**	**532**	**262**	**478**	**20.5**	**274**	**621**	**814**
OCTF-4-0.5	1/28/04	0.5	**749**	**3,450**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-4-1.0	1/28/04	1.0	**650**	**2,860**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-5-0.5	1/28/04	0.5	**1,910**	**3,210**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-5-1.0	1/28/04	1.0	**652**	**1,320**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-6-0.5	1/28/04	0.5	**805**	**3,460**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-6-1.0	1/28/04	1.0	**246**	**873**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-7-0.5	1/28/04	0.5	**777**	**770**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-7-1.0	1/28/04	1.0	ND	**63.5**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-8-0.5	1/28/04	0.5	ND	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-8-1.0	1/28/04	1.0	ND	**56**	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OCTF-9-0.5	1/28/04	0.5	**514**	**1,580**	<5.00	<5.00	<5.00	<5.00	<5.00	<10	**25.6**	**80.6**	**319**	<10.0	<10.0	**93.6**	**406**
OCTF-9-1.0	1/28/04	1.0	**817**	**3,480**	<5.00	<5.00	<5.00	<5.00	**5.27**	**154**	**630**	**569**	**60.9**	<5.00	**5.86**	**18.3**	**115**
ODEQ Generic Soil TPH RBC_{SS} (Occupational Scenario)			70,000	>100,000	--	--	--	--	--	--	--	--	--	--	--	--	--
ODEQ Generic Soil TPH RBC_{SS} (Construction Worker Scenario)			23,000	40,000	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
All concentrations are in milligrams per kilogram; Detections appear in bold
EPH = Extractable Petroleum Hydrocarbons
ft-bgs = Feet below ground surface
ND = Not detected
NS = Not sampled
ODEQ Generic Soil RBC_{SS} = Oregon Department of Environmental Quality Generic Risk-Based Concentrations for Soil
TPH = Total Petroleum Hydrocarbons
VPH = Volatile Petroleum Hydrocarbons

Table 3
Polynuclear Aromatic Hydrocarbons in Soil
Old Caustic Tank Farm Soil Sampling
ATOFINA Chemicals, Inc. Portland, Oregon

Sample ID	Collection Date	Depth (ft-bgs)	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (ghi) perylene	Benzo (k) fluoranthene
OCTF-1-0.5	4/6/04	0.5	**0.238**	<0.100	**0.143**	**1.24**	**0.775**	**0.367**	**0.170**	**0.442**
OCTF-1-1.0	4/6/04	1.0	**0.243**	<0.100	**0.139**	**1.08**	**0.633**	**0.299**	**0.132**	**0.361**
OCTF-3-0.5	4/6/04	0.5	**0.939**	<0.200	**1.94**	**0.313**	**0.219**	<0.200	**0.235**	<0.200
OCTF-3-1.0	4/6/04	1.0	**2.29**	**0.214**	**3.84**	**0.688**	**0.413**	**0.191**	**0.183**	**0.237**
OCTF-9-0.5	4/6/04	0.5	<0.100	<0.100	<0.100	**0.299**	**0.174**	<0.100	**0.236**	<0.100
OCTF-9-1.0	4/6/04	1.0	<0.100	<0.100	<0.100	**0.133**	<0.100	<0.100	<0.100	<0.100
USEPA Region 9 Industrial PRGs			29,000	--	100,000	2.1	0.21	2.1	--	21
ODEQ Generic Soil RBC_{SS} (Occupational Scenario)			41,000	--	>100,000	2.70	0.27	2.70	--	27
ODEQ Generic Soil RBC_{SS} (Construction Worker Scenario)			16,000	--	90,000	21	2.1	21	---	210
ODEQ Precalculated Hot Spot Values			100,000	--	100,000	210	21	210	--	2,100

Sample ID	Collection Date	Depth (ft-bgs)	Chrysene	Dibenz (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
OCTF-1-0.5	4/6/04	0.5	**1.25**	<0.100	**0.387**	<0.100	<0.100	<0.100	**0.319**	**1.74**
OCTF-1-1.0	4/6/04	1.0	**1.09**	<0.100	**0.403**	**0.118**	<0.100	<0.100	**0.327**	**1.56**
OCTF-3-0.5	4/6/04	0.5	**0.563**	<0.200	<0.200	**0.391**	<0.200	**0.250**	**1.75**	**0.923**
OCTF-3-1.0	4/6/04	1.0	**1.44**	<0.100	**0.474**	**1.07**	<0.100	**0.711**	**3.46**	**2.28**
OCTF-9-0.5	4/6/04	0.5	**0.833**	<0.100	**0.153**	<0.100	<0.100	<0.100	**0.694**	**1.40**
OCTF-9-1.0	4/6/04	1.0	**0.133**	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	**0.168**
USEPA Region 9 Industrial PRGs			210	0.21	22,000	26,000	2.1	190	--	29,000
ODEQ Generic Soil RBC_{SS} (Occupational Scenario)			270	0.27	29,000	35,000	2.7	770	--	21,000
ODEQ Generic Soil RBC_{SS} (Construction Worker Scenario)			2,100	2.1	8,900	12,000	21	710	--	6,700
ODEQ Precalculated Hot Spot Values			21,000	21	100,000	100,000	210	1,900	--	100,000

Notes:
All concentrations are in milligrams per kilogram; Detections appear in bold; Shaded values exceed USEPA Region 9 PRGs
ft-bgs = Feet below ground surface
ODEQ Generic Soil RBC_{SS} = Oregon Department of Environmental Quality Generic Risk-Based Concentrations for Soil
USEPA Region 9 PRGs = United States Environmental Protection Agency Region 9 Preliminary Remediation Goals
-- = Not applicable

Table 4
VOCs, Organochlorine Pesticides, PCBs, and Metals in Soil
Old Caustic Tank Farm Soil Sampling
ATOFINA Chemicals, Inc. Portland, Oregon

Sample ID	Collection Date	Depth (ft-bgs)	VOCs	Organochlorine Pesticides			PCBs	Metals		
			1,2,4 Trimethylbenzene	DDD	DDE	DDT		Cadmium	Chromium	Lead
OCTF-1-0.5	1/28/04	0.5	ND	**0.0495**	**0.0564**	**0.291**	ND	<0.556	**9.12**	**3.15**
OCTF-1-1.0	1/28/04	1.0	ND	**0.0275**	**0.0235**	**0.0815**	ND	<0.500	**8.98**	**2.32**
OCTF-2-0.5	1/28/04	0.5	ND	**39.6**	**5.95**	**17.7**	ND	NS	NS	NS
OCTF-2-1.0	1/28/04	1.0	ND	**4.59**	**0.48**	**1.81**	ND	NS	NS	NS
OCTF-3-0.5	1/28/04	0.5	ND	**0.0999**	<0.0067	**0.0109**	ND	<0.500	**17.8**	**8.64**
OCTF-3-1.0	1/28/03	1.0	**0.125**	**0.362**	**0.132**	**0.187**	ND	<0.500	**13.4**	**8.50**
OCTF-4-0.5	1/28/04	0.5	ND	**0.0167**	**0.0189**	**0.0575**	ND	NS	NS	NS
OCTF-4-1.0	1/28/04	1.0	ND	**7.91**	**1.16**	**1.1**	ND	NS	NS	NS
OCTF-5-0.5	1/28/04	0.5	ND	**0.01**	**0.0158**	<0.0067	ND	NS	NS	NS
OCTF-5-1.0	1/28/04	1.0	ND	<0.0067	**0.0118**	<0.0067	ND	NS	NS	NS
OCTF-6-0.5	1/28/04	0.5	ND	**0.0499**	**0.0429**	**0.0932**	ND	NS	NS	NS
OCTF-6-1.0	1/28/04	1.0	ND	**0.0267**	**0.0686**	**0.0215**	ND	NS	NS	NS
OCTF-7-0.5	1/28/04	0.5	ND	<0.0067	**0.226**	**0.0238**	ND	NS	NS	NS
OCTF-7-1.0	1/28/04	1.0	ND	**0.131**	**2.99**	<0.670	ND	NS	NS	NS
OCTF-8-0.5	1/28/04	0.5	ND	**0.0283**	**0.0454**	**0.0941**	ND	NS	NS	NS
OCTF-8-1.0	1/28/04	1.0	ND	<0.0067	**0.0163**	**0.0371**	ND	NS	NS	NS
OCTF-9-0.5	1/28/04	0.5	ND	**0.0474**	**0.0213**	**0.0367**	ND	<0.500	**6.29**	**6.14**
OCTF-9-1.0	1/28/04	1.0	ND	**0.0774**	**0.0354**	**0.0482**	ND	<0.500	**10.0**	**8.75**
OCTF-10-0.5	1/27/04	0.5	NS	**0.0176**	**0.167**	**0.715**	NS	NS	NS	NS
OCTF-10-1.0	1/27/04	1.0	NS	**0.0184**	**0.0956**	**1.34**	NS	NS	NS	NS
OCTF-11-0.5	1/27/04	0.5	NS	**360**	**18,200**	**13,300**	NS	NS	NS	NS
OCTF-11-1.0	1/27/04	1.0	NS	<3,350	**12,300**	<3,350	NS	NS	NS	NS
OCTF-12-0.5	1/27/04	0.5	NS	**0.208**	**5.28**	**5.71**	NS	NS	NS	NS
OCTF-12-1.0	1/27/04	1.0	NS	**0.0215**	**0.664**	**0.164**	NS	NS	NS	NS
OCTF-13-0.5	1/27/04	0.5	NS	**0.144**	**7.87**	**0.672**	NS	NS	NS	NS
OCTF-13-1.0	1/27/04	1.0	NS	**0.248**	**14.6**	**6.74**	NS	NS	NS	NS
ODEQ Default Background Concentrations for Metals			--	--	--	--	--	1	42	17
USEPA Region 9 Industrial PRGs			170	10	7.0	7.0	--	450	450	750
ODEQ Generic Soil RBC_{SS} (Occupational Scenario)			1,500	--	--	--	--	--	--	750
ODEQ Generic Soil RBC_{SS} (Construction Worker Scenario)			1,400	--	--	--	--	--	--	750
ODEQ Precalculated Hot Spot Values			1,700	1000	700	700	--	4,500	45,000	--

Notes:
All concentrations in milligrams per kilogram; Detections appear in bold; Shaded values exceed USEPA Region 9 PRGs
ft-bgs = Feet below ground surface
ND = Not detected
NS = Not sampled
ODEQ Generic Soil RBC_{SS} = Oregon Department of Environmental Quality Generic Risk-Based Concentrations for Soil
PCBs = Polychlorinated Biphenyls
USEPA Region 9 PRGs = United States Environmental Protection Agency Region 9 Preliminary Remediation Goals
VOCs = Volatile Organic Compounds
-- = Not applicable

Attachment 1
Laboratory Analytical Reports

www.ncalabs.com

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
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29 April 2004

Rob Leet
ERM-Bellevue
915-118th Avenue S.E., Suite 130
Bellevue, WA 98005

RE: Atofina-Portland, Old Caustic Tank Farm

Enclosed are the results of analyses for samples received by the laboratory on 04/09/04 09:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager

CASE NARRATIVE for B4D0239

Client: ERM Bellevue
Project Manager: Rob Leet
Project Name: Atofina Portland, Old Caustic Tank Farm
Project Number: 5559.00

1.0 DESCRIPTION OF CASE

Six (6) Soil samples were submitted for the analysis of:

- Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method
- Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
- Total Metals by EPA 6000/7000 Series Methods
- Polynuclear Aromatic Compounds by GC/MS With Selective Ion Monitoring

2.0 COMMENTS ON SAMPLE RECEIPT

The samples were received and logged in 9th April 2004 at a temperature of 2.0°C.

3.0 PREPARATION AND ANALYSIS

Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method
The project samples were extracted into analytical batch 4D14007. When initially analyzed the closing Continuous Calibration Verification (CCV) standard bracketing the samples was above method control limits for n-Hexane. The samples were re-shot within hold and again the closing CCV was above control limits for n-Hexane. The out of control n-Hexane effects the C5-C6 Aliphatic Carbon range for all project samples other than, OCTF-9-0.5. Due to carry over issues project sample, OCTF-9-0.5 was re-short apart for the other samples and bracketed with passing CCV's. No additional anomalies or discrepancies were associated with this analysis other than those already qualified in the data.

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
The surrogate, 1-Chlorooctadecane in project sample OCTF-1-0.5 was below method established control limits. The sample was re-extracted into analytical batch 4D16012 within method hold time. Since all surrogates were within control and all analytical batch Quality Control (QC) samples were with in control only the re-extracted sample results were reported. No additional anomalies or discrepancies were associated with this analysis other than those already qualified in the data.

_____
Amar Gill
Project Manager
North Creek Analytical

CASE NARRATIVE for B4D0239

Total Metals by EPA 6000/7000 Series Methods
No additional anomalies or discrepancies were associated with this analysis other than those already qualified in the data

Polynuclear Aromatic Compounds by GC/MS With Selective Ion Monitoring
No additional anomalies or discrepancies were associated with this analysis other than those already qualified in the data.

_____
Amar Gill
Project Manager
North Creek Analytical

B4D0239

Environmental Resources Management

CHAIN OF CUSTODY RECORD

NO: 0280

Page 1 of 1

915-118th Avenue S.E. Suite 130 ● Bellevue, WA 98005 ● (425) 462-8591 ● FAX (425) 455-3573

5559.00 | Old Caustic Tank Farm

Brian Magee

NCA - Beaverton OR

													Petroleum Fractionation VPH and EPH	PAHs Full list	Metals Cd, Cr, Pb							
~~OCTF-1-0.5~~																						
OCTF-1-1.0	4/6/04	1535	X		Hand Auger	—	4	2-8oz	2	X			X	X	X							-01
OCTF-1-0.5		1520																				-02
OCTF-3-0.5		1555																				-03
OCTF-3-1.0		1625																				-04
OCTF-9-0.5		1640																				-05
OCTF-9-1.0		1650											X	X	X							-06

	4/6/04	1750	Erica Dakan	4/6/04	1750	TB 2.0°C w/cs
NCA	4/8/04	1200	Tom Blank	4/9/04	09:30	3.0°C ccc/RM

☐ BOTTLE INTACT ☐ CUSTODY SEALS ☐ CHILLED
☐ PRESERVED ☐ SEALS INTACT ☐ SEE REMARKS

SEND REPORT TO:

WHITE - LABORATORY COPY CANARY - FIELD COPY PINK - DATABASE MANAGER GOLD - PROJECT FILE

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM-Bellevue	Project:	Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Rob Leet	04/29/04 14:42

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OCTF-1-1.0	B4D0239-01	Soil	04/06/04 15:35	04/09/04 09:30
OCTF-1-0.5	B4D0239-02	Soil	04/06/04 15:20	04/09/04 09:30
OCTF-3-0.5	B4D0239-03	Soil	04/06/04 15:55	04/09/04 09:30
OCTF-3-1.0	B4D0239-04	Soil	04/06/04 16:25	04/09/04 09:30
OCTF-9-0.5	B4D0239-05	Soil	04/06/04 16:40	04/09/04 09:30
OCTF-9-1.0	B4D0239-06	Soil	04/06/04 16:50	04/09/04 09:30

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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-1-1.0 (B4D0239-01) Soil Sampled: 04/06/04 15:35 Received: 04/09/04 09:30									**X**
C5-C6 Aliphatics	ND	5.00	mg/kg dry	1	4D14007	04/14/04	04/14/04	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aromatics	ND	5.00	"	"	"	"	"	"	
C12-C13 Aromatics	ND	5.00	"	"	"	"	"	"	
Total VPH (TVPH)	ND	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*97.1 %*	*60-140*			"	"	"	"	
Surrogate: 4-BFB (PID)	*98.1 %*	*60-140*			"	"	"	"	
OCTF-1-0.5 (B4D0239-02) Soil Sampled: 04/06/04 15:20 Received: 04/09/04 09:30									**X**
C5-C6 Aliphatics	ND	5.00	mg/kg dry	1	4D14007	04/14/04	04/14/04	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aromatics	ND	5.00	"	"	"	"	"	"	
C12-C13 Aromatics	**7.62**	5.00	"	"	"	"	"	"	
Total VPH (TVPH)	**7.62**	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*99.0 %*	*60-140*			"	"	"	"	
Surrogate: 4-BFB (PID)	*96.8 %*	*60-140*			"	"	"	"	
OCTF-3-0.5 (B4D0239-03) Soil Sampled: 04/06/04 15:55 Received: 04/09/04 09:30									**X**
C5-C6 Aliphatics	ND	5.00	mg/kg dry	1	4D14007	04/14/04	04/14/04	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aromatics	**19.0**	5.00	"	"	"	"	"	"	
C12-C13 Aromatics	**95.7**	5.00	"	"	"	"	"	"	
Total VPH (TVPH)	**115**	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*172 %*	*60-140*			"	"	"	"	*S-04*
Surrogate: 4-BFB (PID)	*113 %*	*60-140*			"	"	"	"	

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Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-3-1.0 (B4D0239-04) Soil Sampled: 04/06/04 16:25 Received: 04/09/04 09:30									**X**
C5-C6 Aliphatics	ND	10.0	mg/kg dry	2	4D14007	04/14/04	04/14/04	WA MTCA-VPH	
C6-C8 Aliphatics	ND	10.0	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	10.0	"	"	"	"	"	"	
C8-C10 Aromatics	**23.3**	10.0	"	"	"	"	"	"	
C12-C13 Aromatics	**195**	10.0	"	"	"	"	"	"	
Total VPH (TVPH)	**219**	10.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*170 %*	*60-140*			"	"	"	"	*S-04*
Surrogate: 4-BFB (PID)	*96.7 %*	*60-140*			"	"	"	"	
OCTF-9-0.5 (B4D0239-05) Soil Sampled: 04/06/04 16:40 Received: 04/09/04 09:30									
C5-C6 Aliphatics	ND	5.00	mg/kg dry	1	4D14007	04/14/04	04/16/04	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aromatics	ND	5.00	"	"	"	"	"	"	
C12-C13 Aromatics	ND	5.00	"	"	"	"	"	"	
Total VPH (TVPH)	ND	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*95.9 %*	*60-140*			"	"	"	"	
Surrogate: 4-BFB (PID)	*83.9 %*	*60-140*			"	"	"	"	
OCTF-9-1.0 (B4D0239-06) Soil Sampled: 04/06/04 16:50 Received: 04/09/04 09:30									**X**
C5-C6 Aliphatics	ND	5.00	mg/kg dry	1	4D14007	04/14/04	04/14/04	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aromatics	ND	5.00	"	"	"	"	"	"	
C12-C13 Aromatics	**5.27**	5.00	"	"	"	"	"	"	
Total VPH (TVPH)	**5.27**	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*95.2 %*	*60-140*			"	"	"	"	
Surrogate: 4-BFB (PID)	*88.3 %*	*60-140*			"	"	"	"	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-1-1.0 (B4D0239-01) Soil Sampled: 04/06/04 15:35 Received: 04/09/04 09:30									
Extractable Petroleum Hydrocarbons	**4320**	160	mg/kg dry wt.	4	[CALC]	04/13/04	04/15/04	WA MTCA-EPH	
C10-C12 Aliphatics	ND	20.0	mg/kg dry	"	4D13014	"	"	"	
C12-C16 Aliphatics	**171**	20.0	"	"	"	"	"	"	
C16-C21 Aliphatics	**623**	20.0	"	"	"	"	"	"	
C21-C34 Aliphatics	**2370**	20.0	"	"	"	"	"	"	
C10-C12 Aromatics	ND	20.0	"	"	"	"	"	"	
C12-C16 Aromatics	ND	20.0	"	"	"	"	"	"	
C16-C21 Aromatics	**359**	20.0	"	"	"	"	"	"	
C21-C34 Aromatics	**797**	20.0	"	"	"	"	"	"	
Surrogate: o-Terphenyl	*90.6 %*	*60-140*			"	"	"	"	
Surrogate: 1-Chlorooctadecane	*118 %*	*60-140*			"	"	"	"	
OCTF-1-0.5 (B4D0239-02RE1) Soil Sampled: 04/06/04 15:20 Received: 04/09/04 09:30									
Extractable Petroleum Hydrocarbons	**5840**	320	mg/kg dry wt.	8	[CALC]	04/16/04	04/21/04	WA MTCA-EPH	
C10-C12 Aliphatics	ND	40.0	mg/kg dry	"	4D16012	"	"	"	
C12-C16 Aliphatics	**230**	40.0	"	"	"	"	"	"	
C16-C21 Aliphatics	**799**	40.0	"	"	"	"	"	"	
C21-C34 Aliphatics	**2960**	40.0	"	"	"	"	"	"	
C10-C12 Aromatics	ND	40.0	"	"	"	"	"	"	
C12-C16 Aromatics	ND	40.0	"	"	"	"	"	"	
C16-C21 Aromatics	**585**	40.0	"	"	"	"	"	"	
C21-C34 Aromatics	**1270**	40.0	"	"	"	"	"	"	
Surrogate: o-Terphenyl	*98.5 %*	*60-140*			"	"	"	"	
Surrogate: 1-Chlorooctadecane	*120 %*	*60-140*			"	"	"	"	

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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-3-0.5 (B4D0239-03) Soil Sampled: 04/06/04 15:55 Received: 04/09/04 09:30									
Extractable Petroleum Hydrocarbons	**2470**	80.0	mg/kg dry wt.	1	[CALC]	04/13/04	04/15/04	WA MTCA-EPH	
C10-C12 Aliphatics	**53.3**	10.0	mg/kg dry	"	4D13014	"	"	"	
C12-C16 Aliphatics	**277**	10.0	"	"	"	"	"	"	
C16-C21 Aliphatics	**207**	10.0	"	"	"	"	"	"	
C21-C34 Aliphatics	**691**	10.0	"	"	"	"	"	"	
C10-C12 Aromatics	ND	10.0	"	"	"	"	"	"	
C12-C16 Aromatics	**119**	10.0	"	"	"	"	"	"	
C16-C21 Aromatics	**317**	10.0	"	"	"	"	"	"	
C21-C34 Aromatics	**804**	10.0	"	"	"	"	"	"	
Surrogate: o-Terphenyl	*90.7 %*	*60-140*			"	"	"	"	
Surrogate: 1-Chlorooctadecane	*91.1 %*	*60-140*			"	"	"	"	
OCTF-3-1.0 (B4D0239-04) Soil Sampled: 04/06/04 16:25 Received: 04/09/04 09:30									
Extractable Petroleum Hydrocarbons	**3120**	80.0	mg/kg dry wt.	2	[CALC]	04/13/04	04/15/04	WA MTCA-EPH	
C10-C12 Aliphatics	**123**	10.0	mg/kg dry	"	4D13014	"	"	"	
C12-C16 Aliphatics	**532**	10.0	"	"	"	"	"	"	
C16-C21 Aliphatics	**262**	10.0	"	"	"	"	"	"	
C21-C34 Aliphatics	**478**	10.0	"	"	"	"	"	"	
C10-C12 Aromatics	**20.5**	10.0	"	"	"	"	"	"	
C12-C16 Aromatics	**274**	10.0	"	"	"	"	"	"	
C16-C21 Aromatics	**621**	10.0	"	"	"	"	"	"	
C21-C34 Aromatics	**814**	10.0	"	"	"	"	"	"	
Surrogate: o-Terphenyl	*152 %*	*60-140*			"	"	"	"	*S-04*
Surrogate: 1-Chlorooctadecane	*97.4 %*	*60-140*			"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-9-0.5 (B4D0239-05) Soil Sampled: 04/06/04 16:40 Received: 04/09/04 09:30									
Extractable Petroleum Hydrocarbons	**925**	80.0	mg/kg dry wt.	2	[CALC]	04/13/04	04/15/04	WA MTCA-EPH	
C10-C12 Aliphatics	ND	10.0	mg/kg dry	"	4D13014	"	"	"	
C12-C16 Aliphatics	**25.6**	10.0	"	"	"	"	"	"	
C16-C21 Aliphatics	**80.6**	10.0	"	"	"	"	"	"	
C21-C34 Aliphatics	**319**	10.0	"	"	"	"	"	"	
C10-C12 Aromatics	ND	10.0	"	"	"	"	"	"	
C12-C16 Aromatics	ND	10.0	"	"	"	"	"	"	
C16-C21 Aromatics	**93.6**	10.0	"	"	"	"	"	"	
C21-C34 Aromatics	**406**	10.0	"	"	"	"	"	"	
Surrogate: o-Terphenyl	*83.5 %*	*60-140*			*"*	*"*	*"*	*"*	
Surrogate: 1-Chlorooctadecane	*84.2 %*	*60-140*			*"*	*"*	*"*	*"*	
OCTF-9-1.0 (B4D0239-06) Soil Sampled: 04/06/04 16:50 Received: 04/09/04 09:30									
Extractable Petroleum Hydrocarbons	**1550**	60.0	mg/kg dry wt.	2	[CALC]	04/13/04	04/15/04	WA MTCA-EPH	
C10-C12 Aliphatics	**154**	10.0	mg/kg dry	"	4D13014	"	"	"	
C12-C16 Aliphatics	**630**	10.0	"	"	"	"	"	"	
C16-C21 Aliphatics	**569**	10.0	"	"	"	"	"	"	
C21-C34 Aliphatics	**60.9**	10.0	"	"	"	"	"	"	
C10-C12 Aromatics	ND	5.00	"	1	"	"	04/15/04	"	
C12-C16 Aromatics	**5.86**	5.00	"	"	"	"	"	"	
C16-C21 Aromatics	**18.3**	5.00	"	"	"	"	"	"	
C21-C34 Aromatics	**115**	5.00	"	"	"	"	"	"	
Surrogate: o-Terphenyl	*97.9 %*	*60-140*			*"*	*"*	*"*	*"*	
Surrogate: 1-Chlorooctadecane	*121 %*	*60-140*			*"*	*"*	*04/15/04*	*"*	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
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541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-1-1.0 (B4D0239-01) Soil Sampled: 04/06/04 15:35 Received: 04/09/04 09:30									
Cadmium	ND	0.500	mg/kg dry	1	4D12024	04/12/04	04/13/04	EPA 6020	
Chromium	**8.98**	0.500	"	"	"	"	"	"	
Lead	**2.32**	0.500	"	"	"	"	"	"	
OCTF-1-0.5 (B4D0239-02) Soil Sampled: 04/06/04 15:20 Received: 04/09/04 09:30									
Cadmium	ND	0.556	mg/kg dry	1	4D12024	04/12/04	04/13/04	EPA 6020	
Chromium	**9.12**	0.556	"	"	"	"	"	"	
Lead	**3.15**	0.556	"	"	"	"	"	"	
OCTF-3-0.5 (B4D0239-03) Soil Sampled: 04/06/04 15:55 Received: 04/09/04 09:30									
Cadmium	ND	0.500	mg/kg dry	1	4D12024	04/12/04	04/13/04	EPA 6020	
Chromium	**17.8**	0.500	"	"	"	"	"	"	
Lead	**8.64**	0.500	"	"	"	"	"	"	
OCTF-3-1.0 (B4D0239-04) Soil Sampled: 04/06/04 16:25 Received: 04/09/04 09:30									
Cadmium	ND	0.500	mg/kg dry	1	4D12024	04/12/04	04/13/04	EPA 6020	
Chromium	**13.4**	0.500	"	"	"	"	"	"	
Lead	**8.50**	0.500	"	"	"	"	"	"	
OCTF-9-0.5 (B4D0239-05) Soil Sampled: 04/06/04 16:40 Received: 04/09/04 09:30									
Cadmium	ND	0.500	mg/kg dry	1	4D12024	04/12/04	04/13/04	EPA 6020	
Chromium	**6.29**	0.500	"	"	"	"	"	"	
Lead	**6.14**	0.500	"	"	"	"	"	"	
OCTF-9-1.0 (B4D0239-06) Soil Sampled: 04/06/04 16:50 Received: 04/09/04 09:30									
Cadmium	ND	0.500	mg/kg dry	1	4D12024	04/12/04	04/13/04	EPA 6020	
Chromium	**10.0**	0.500	"	"	"	"	"	"	
Lead	**8.75**	0.500	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project:	Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Rob Leet	04/29/04 14:42

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-1-1.0 (B4D0239-01) Soil Sampled: 04/06/04 15:35 Received: 04/09/04 09:30									
Acenaphthene	**0.243**	0.100	mg/kg dry	10	4D13014	04/13/04	04/16/04	8270C-SIM	
Acenaphthylene	ND	0.100	"	"	"	"	"	"	
Anthracene	**0.139**	0.100	"	"	"	"	"	"	
Benzo (a) anthracene	**1.08**	0.100	"	"	"	"	"	"	
Benzo (a) pyrene	**0.633**	0.100	"	"	"	"	"	"	
Benzo (b) fluoranthene	**0.299**	0.100	"	"	"	"	"	"	
Benzo (ghi) perylene	**0.132**	0.100	"	"	"	"	"	"	
Benzo (k) fluoranthene	**0.361**	0.100	"	"	"	"	"	"	
Chrysene	**1.09**	0.100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.100	"	"	"	"	"	"	
Fluoranthene	**0.403**	0.100	"	"	"	"	"	"	
Fluorene	**0.118**	0.100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
Phenanthrene	**0.327**	0.100	"	"	"	"	"	"	
Pyrene	**1.56**	0.100	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	*75.2 %*	*28-161*			"	"	"	"	
OCTF-1-0.5 (B4D0239-02) Soil Sampled: 04/06/04 15:20 Received: 04/09/04 09:30									
Acenaphthene	**0.238**	0.100	mg/kg dry	10	4D13014	04/13/04	04/16/04	8270C-SIM	
Acenaphthylene	ND	0.100	"	"	"	"	"	"	
Anthracene	**0.143**	0.100	"	"	"	"	"	"	
Benzo (a) anthracene	**1.24**	0.100	"	"	"	"	"	"	
Benzo (a) pyrene	**0.775**	0.100	"	"	"	"	"	"	
Benzo (b) fluoranthene	**0.367**	0.100	"	"	"	"	"	"	
Benzo (ghi) perylene	**0.170**	0.100	"	"	"	"	"	"	
Benzo (k) fluoranthene	**0.442**	0.100	"	"	"	"	"	"	
Chrysene	**1.25**	0.100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.100	"	"	"	"	"	"	
Fluoranthene	**0.387**	0.100	"	"	"	"	"	"	
Fluorene	ND	0.100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
Phenanthrene	**0.319**	0.100	"	"	"	"	"	"	
Pyrene	**1.74**	0.100	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	*77.6 %*	*28-161*			"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project:	Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Rob Leet	04/29/04 14:42

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-3-0.5 (B4D0239-03) Soil Sampled: 04/06/04 15:55 Received: 04/09/04 09:30									
Acenaphthene	**0.939**	0.200	mg/kg dry	10	4D13014	04/13/04	04/16/04	8270C-SIM	
Acenaphthylene	ND	0.200	"	"	"	"	"	"	
Anthracene	**1.94**	0.200	"	"	"	"	"	"	
Benzo (a) anthracene	**0.313**	0.200	"	"	"	"	"	"	
Benzo (a) pyrene	**0.219**	0.200	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.200	"	"	"	"	"	"	
Benzo (ghi) perylene	**0.235**	0.200	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.200	"	"	"	"	"	"	
Chrysene	**0.563**	0.200	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.200	"	"	"	"	"	"	
Fluoranthene	ND	0.200	"	"	"	"	"	"	
Fluorene	**0.391**	0.200	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.200	"	"	"	"	"	"	
Naphthalene	**0.250**	0.200	"	"	"	"	"	"	
Phenanthrene	**1.75**	0.200	"	"	"	"	"	"	
Pyrene	**0.923**	0.200	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	*72.5 %*	*28-161*			"	"	"	"	
OCTF-3-1.0 (B4D0239-04) Soil Sampled: 04/06/04 16:25 Received: 04/09/04 09:30									
Acenaphthene	**2.29**	0.100	mg/kg dry	10	4D13014	04/13/04	04/16/04	8270C-SIM	
Acenaphthylene	**0.214**	0.100	"	"	"	"	"	"	
Anthracene	**3.84**	0.100	"	"	"	"	"	"	
Benzo (a) anthracene	**0.688**	0.100	"	"	"	"	"	"	
Benzo (a) pyrene	**0.413**	0.100	"	"	"	"	"	"	
Benzo (b) fluoranthene	**0.191**	0.100	"	"	"	"	"	"	
Benzo (ghi) perylene	**0.183**	0.100	"	"	"	"	"	"	
Benzo (k) fluoranthene	**0.237**	0.100	"	"	"	"	"	"	
Chrysene	**1.44**	0.100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.100	"	"	"	"	"	"	
Fluoranthene	**0.474**	0.100	"	"	"	"	"	"	
Fluorene	**1.07**	0.100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.100	"	"	"	"	"	"	
Naphthalene	**0.711**	0.100	"	"	"	"	"	"	
Phenanthrene	**3.46**	0.100	"	"	"	"	"	"	
Pyrene	**2.28**	0.100	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	*74.8 %*	*28-161*			"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project:	Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Rob Leet	04/29/04 14:42

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-9-0.5 (B4D0239-05) Soil Sampled: 04/06/04 16:40 Received: 04/09/04 09:30									
Acenaphthene	ND	0.100	mg/kg dry	10	4D13014	04/13/04	04/17/04	8270C-SIM	
Acenaphthylene	ND	0.100	"	"	"	"	"	"	
Anthracene	ND	0.100	"	"	"	"	"	"	
Benzo (a) anthracene	**0.299**	0.100	"	"	"	"	"	"	
Benzo (a) pyrene	**0.174**	0.100	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.100	"	"	"	"	"	"	
Benzo (ghi) perylene	**0.236**	0.100	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.100	"	"	"	"	"	"	
Chrysene	**0.833**	0.100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.100	"	"	"	"	"	"	
Fluoranthene	**0.153**	0.100	"	"	"	"	"	"	
Fluorene	ND	0.100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
Phenanthrene	**0.694**	0.100	"	"	"	"	"	"	
Pyrene	**1.40**	0.100	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	*84.9 %*	*28-161*			"	"	"	"	
OCTF-9-1.0 (B4D0239-06) Soil Sampled: 04/06/04 16:50 Received: 04/09/04 09:30									
Acenaphthene	ND	0.100	mg/kg dry	10	4D13014	04/13/04	04/16/04	8270C-SIM	
Acenaphthylene	ND	0.100	"	"	"	"	"	"	
Anthracene	ND	0.100	"	"	"	"	"	"	
Benzo (a) anthracene	**0.133**	0.100	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.100	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.100	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	0.100	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.100	"	"	"	"	"	"	
Chrysene	**0.133**	0.100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.100	"	"	"	"	"	"	
Fluoranthene	ND	0.100	"	"	"	"	"	"	
Fluorene	ND	0.100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
Phenanthrene	ND	0.100	"	"	"	"	"	"	
Pyrene	**0.168**	0.100	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	*75.0 %*	*28-161*			"	"	"	"	

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ERM-Bellevue	Project:	Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Rob Leet	04/29/04 14:42

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
OCTF-1-1.0 (B4D0239-01) Soil Sampled: 04/06/04 15:35 Received: 04/09/04 09:30									
Dry Weight	**95.9**	1.00	%	1	4D12042	04/12/04	04/13/04	BSOPSPL003R08	
OCTF-1-0.5 (B4D0239-02) Soil Sampled: 04/06/04 15:20 Received: 04/09/04 09:30									
Dry Weight	**98.1**	1.00	%	1	4D12042	04/12/04	04/13/04	BSOPSPL003R08	
OCTF-3-0.5 (B4D0239-03) Soil Sampled: 04/06/04 15:55 Received: 04/09/04 09:30									
Dry Weight	**85.2**	1.00	%	1	4D12042	04/12/04	04/13/04	BSOPSPL003R08	
OCTF-3-1.0 (B4D0239-04) Soil Sampled: 04/06/04 16:25 Received: 04/09/04 09:30									
Dry Weight	**87.2**	1.00	%	1	4D12042	04/12/04	04/13/04	BSOPSPL003R08	
OCTF-9-0.5 (B4D0239-05) Soil Sampled: 04/06/04 16:40 Received: 04/09/04 09:30									
Dry Weight	**96.0**	1.00	%	1	4D12042	04/12/04	04/13/04	BSOPSPL003R08	
OCTF-9-1.0 (B4D0239-06) Soil Sampled: 04/06/04 16:50 Received: 04/09/04 09:30									
Dry Weight	**95.2**	1.00	%	1	4D12042	04/12/04	04/13/04	BSOPSPL003R08	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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907.563.9200 fax 907.563.9210

ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D14007: Prepared 04/14/04 Using EPA 5030B (MeOH)										
Blank (4D14007-BLK1)										
C5-C6 Aliphatics	ND	5.00	mg/kg							
C6-C8 Aliphatics	ND	5.00	"							
C8-C10 Aliphatics	ND	5.00	"							
C8-C10 Aromatics	ND	5.00	"							
C12-C13 Aromatics	ND	5.00	"							
Total VPH (TVPH)	ND	5.00	"							
Surrogate: 4-BFB (FID)	*4.12*		*"*	*4.00*		*103*	*60-140*			
Surrogate: 4-BFB (PID)	*5.09*		*"*	*4.00*		*127*	*60-140*			
LCS (4D14007-BS1)										
Total VPH (TVPH)	9.09	5.00	mg/kg	10.0		90.9	70-130			
Surrogate: 4-BFB (FID)	*4.36*		*"*	*4.00*		*109*	*60-140*			
Surrogate: 4-BFB (PID)	*3.89*		*"*	*4.00*		*97.2*	*60-140*			
LCS Dup (4D14007-BSD1)										
Total VPH (TVPH)	8.60	5.00	mg/kg	10.0		86.0	70-130	5.54	25	
Surrogate: 4-BFB (FID)	*4.24*		*"*	*4.00*		*106*	*60-140*			
Surrogate: 4-BFB (PID)	*3.90*		*"*	*4.00*		*97.5*	*60-140*			
Matrix Spike (4D14007-MS3)					**Source: B4D0239-06**					
Total VPH (TVPH)	11.8	5.00	mg/kg dry	10.5	5.27	62.2	70-130			Q-02
Surrogate: 4-BFB (FID)	*3.90*		*"*	*4.20*		*92.9*	*60-140*			
Surrogate: 4-BFB (PID)	*3.47*		*"*	*4.20*		*82.6*	*60-140*			
Matrix Spike Dup (4D14007-MSD3)					**Source: B4D0239-06**					
Total VPH (TVPH)	12.0	5.00	mg/kg dry	10.5	5.27	64.1	70-130	1.68	25	Q-02
Surrogate: 4-BFB (FID)	*3.85*		*"*	*4.20*		*91.7*	*60-140*			
Surrogate: 4-BFB (PID)	*3.87*		*"*	*4.20*		*92.1*	*60-140*			

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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D13014: Prepared 04/13/04 Using EPA 3545										
Blank (4D13014-BLK1)										
C8-C10 Aliphatics	ND	5.00	mg/kg							
C10-C12 Aliphatics	ND	5.00	"							
C12-C16 Aliphatics	ND	5.00	"							
C16-C21 Aliphatics	ND	5.00	"							
C21-C34 Aliphatics	ND	5.00	"							
C8-C10 Aromatics	ND	5.00	"							
C10-C12 Aromatics	ND	5.00	"							
C12-C16 Aromatics	ND	5.00	"							
C16-C21 Aromatics	ND	5.00	"							
C21-C34 Aromatics	ND	5.00	"							
Surrogate: o-Terphenyl	*8.71*		*"*	*13.3*		*65.5*	*60-140*			
Surrogate: 1-Chlorooctadecane	*12.7*		*"*	*13.3*		*95.5*	*60-140*			
LCS (4D13014-BS1)										
C8-C10 Aliphatics	4.12	5.00	mg/kg	3.33		124	70-130			
C10-C12 Aliphatics	3.08	5.00	"	3.33		92.5	70-130			
C12-C16 Aliphatics	5.78	5.00	"	6.67		86.7	70-130			
C16-C21 Aliphatics	6.74	5.00	"	6.67		101	70-130			
C21-C34 Aliphatics	23.7	5.00	"	23.3		102	70-130			
C8-C10 Aromatics	ND	5.00	"	3.33			70-130			Q-01
C10-C12 Aromatics	2.73	5.00	"	3.33		82.0	70-130			
C12-C16 Aromatics	10.2	5.00	"	10.0		102	70-130			
C16-C21 Aromatics	14.7	5.00	"	16.7		88.0	70-130			
C21-C34 Aromatics	23.9	5.00	"	26.7		89.5	70-130			
Surrogate: o-Terphenyl	*12.6*		*"*	*13.3*		*94.7*	*60-140*			
Surrogate: 1-Chlorooctadecane	*12.3*		*"*	*13.3*		*92.5*	*60-140*			
LCS Dup (4D13014-BSD1)										
C8-C10 Aliphatics	4.05	5.00	mg/kg	3.33		122	70-130	1.71	25	
C10-C12 Aliphatics	3.10	5.00	"	3.33		93.1	70-130	0.647	25	
C12-C16 Aliphatics	6.07	5.00	"	6.67		91.0	70-130	4.89	25	
C16-C21 Aliphatics	6.70	5.00	"	6.67		100	70-130	0.595	25	
C21-C34 Aliphatics	24.5	5.00	"	23.3		105	70-130	3.32	25	
C8-C10 Aromatics	ND	5.00	"	3.33			70-130		25	Q-01
C10-C12 Aromatics	2.98	5.00	"	3.33		89.5	70-130	8.76	25	
C12-C16 Aromatics	11.3	5.00	"	10.0		113	70-130	10.2	25	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D13014: Prepared 04/13/04 Using EPA 3545										
LCS Dup (4D13014-BSD1)										
C16-C21 Aromatics	15.8	5.00	mg/kg	16.7		94.6	70-130	7.21	25	
C21-C34 Aromatics	24.9	5.00	"	26.7		93.3	70-130	4.10	25	
Surrogate: o-Terphenyl	*12.4*		*"*	*13.3*		*93.2*	*60-140*			
Surrogate: 1-Chlorooctadecane	*13.0*		*"*	*13.3*		*97.7*	*60-140*			
Matrix Spike (4D13014-MS1)					**Source: B4D0180-01**					
C8-C10 Aliphatics	4.70	5.00	mg/kg dry	3.47	2.21	71.8	70-130			
C10-C12 Aliphatics	3.77	5.00	"	3.47	0.512	93.9	70-130			
C12-C16 Aliphatics	6.58	5.00	"	6.94	ND	94.8	70-130			
C16-C21 Aliphatics	14.3	5.00	"	6.94	14.8	-7.20	70-130			Q-02
C21-C34 Aliphatics	147	5.00	"	24.3	243	-395	70-130			Q-02
C8-C10 Aromatics	ND	5.00	"	3.47	ND		70-130	NA		Q-02
C10-C12 Aromatics	2.62	5.00	"	3.47	0.121	72.0	70-130			
C12-C16 Aromatics	15.8	5.00	"	10.4	4.80	106	70-130			
C16-C21 Aromatics	17.3	5.00	"	17.4	2.74	83.7	70-130			
C21-C34 Aromatics	41.3	5.00	"	27.8	29.7	41.7	70-130			Q-02
Surrogate: o-Terphenyl	*13.3*		*"*	*13.9*		*95.7*	*60-140*			
Surrogate: 1-Chlorooctadecane	*12.8*		*"*	*13.9*		*92.1*	*60-140*			
Matrix Spike Dup (4D13014-MSD1)					**Source: B4D0180-01**					
C8-C10 Aliphatics	4.73	5.00	mg/kg dry	3.47	2.21	72.6	70-130	0.636	25	
C10-C12 Aliphatics	3.37	5.00	"	3.47	0.512	82.4	70-130	11.2	25	
C12-C16 Aliphatics	6.76	5.00	"	6.94	ND	97.4	70-130	2.70	25	
C16-C21 Aliphatics	21.7	5.00	"	6.94	14.8	99.4	70-130	41.1	25	Q-16
C21-C34 Aliphatics	272	5.00	"	24.3	243	119	70-130	59.7	25	Q-16
C8-C10 Aromatics	ND	5.00	"	3.47	ND		70-130	NA	25	Q-01
C10-C12 Aromatics	3.16	5.00	"	3.47	0.121	87.6	70-130	18.7	25	
C12-C16 Aromatics	11.6	5.00	"	10.4	4.80	65.4	70-130	30.7	25	Q-16
C16-C21 Aromatics	19.8	5.00	"	17.4	2.74	98.0	70-130	13.5	25	
C21-C34 Aromatics	65.5	5.00	"	27.8	29.7	129	70-130	45.3	25	Q-16
Surrogate: o-Terphenyl	*13.8*		*"*	*13.9*		*99.3*	*60-140*			
Surrogate: 1-Chlorooctadecane	*12.8*		*"*	*13.9*		*92.1*	*60-140*			

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D16012: Prepared 04/16/04 Using EPA 3545										
Blank (4D16012-BLK1)										
C8-C10 Aliphatics	ND	5.00	mg/kg							
C10-C12 Aliphatics	ND	5.00	"							
C12-C16 Aliphatics	ND	5.00	"							
C16-C21 Aliphatics	ND	5.00	"							
C21-C34 Aliphatics	ND	5.00	"							
C8-C10 Aromatics	ND	5.00	"							
C10-C12 Aromatics	ND	5.00	"							
C12-C16 Aromatics	ND	5.00	"							
C16-C21 Aromatics	ND	5.00	"							
C21-C34 Aromatics	ND	5.00	"							
Surrogate: o-Terphenyl	*12.1*		*"*	*13.3*		*91.0*	*60-140*			
Surrogate: 1-Chlorooctadecane	*11.5*		*"*	*13.3*		*86.5*	*60-140*			
LCS (4D16012-BS1)										
C8-C10 Aliphatics	6.89	5.00	mg/kg	8.33		82.7	70-130			
C10-C12 Aliphatics	2.98	5.00	"	3.33		89.5	70-130			
C12-C16 Aliphatics	5.46	5.00	"	6.67		81.9	70-130			
C16-C21 Aliphatics	6.06	5.00	"	6.67		90.9	70-130			
C21-C34 Aliphatics	22.2	5.00	"	23.3		95.3	70-130			
C8-C10 Aromatics	21.9	5.00	"	53.3		41.1	70-130			X
C10-C12 Aromatics	10.9	5.00	"	13.3		82.0	70-130			
C12-C16 Aromatics	14.0	5.00	"	10.0		140	70-130			X
C16-C21 Aromatics	15.7	5.00	"	16.7		94.0	70-130			
C21-C34 Aromatics	23.1	5.00	"	26.7		86.5	70-130			
Surrogate: o-Terphenyl	*12.4*		*"*	*13.3*		*93.2*	*60-140*			
Surrogate: 1-Chlorooctadecane	*11.3*		*"*	*13.3*		*85.0*	*60-140*			
LCS Dup (4D16012-BSD1)										
C8-C10 Aliphatics	9.89	5.00	mg/kg	8.33		119	70-130	35.8	25	Q-07
C10-C12 Aliphatics	3.37	5.00	"	3.33		101	70-130	12.3	25	
C12-C16 Aliphatics	6.05	5.00	"	6.67		90.7	70-130	10.3	25	
C16-C21 Aliphatics	6.46	5.00	"	6.67		96.9	70-130	6.39	25	
C21-C34 Aliphatics	23.8	5.00	"	23.3		102	70-130	6.96	25	
C8-C10 Aromatics	23.9	5.00	"	53.3		44.8	70-130	8.73	25	X
C10-C12 Aromatics	11.5	5.00	"	13.3		86.5	70-130	5.36	25	
C12-C16 Aromatics	10.3	5.00	"	10.0		103	70-130	30.5	25	Q-07

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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D16012: Prepared 04/16/04 Using EPA 3545										
LCS Dup (4D16012-BSD1)										
C16-C21 Aromatics	16.3	5.00	mg/kg	16.7		97.6	70-130	3.75	25	
C21-C34 Aromatics	23.9	5.00	"	26.7		89.5	70-130	3.40	25	
Surrogate: o-Terphenyl	*12.9*		*"*	*13.3*		*97.0*	*60-140*			
Surrogate: 1-Chlorooctadecane	*12.6*		*"*	*13.3*		*94.7*	*60-140*			
Matrix Spike (4D16012-MS1)					**Source: B4D0119-10**					
C8-C10 Aliphatics	10.3	5.00	mg/kg dry	9.09	0.918	103	70-130			
C10-C12 Aliphatics	3.64	5.00	"	3.64	0.346	90.5	70-130			
C12-C16 Aliphatics	6.55	5.00	"	7.27	ND	90.1	70-130			
C16-C21 Aliphatics	7.27	5.00	"	7.27	ND	100	70-130			
C21-C34 Aliphatics	27.3	5.00	"	25.4	2.39	98.1	70-130			
C8-C10 Aromatics	22.0	5.00	"	58.2	ND	37.8	70-130			Q-01
C10-C12 Aromatics	11.8	5.00	"	14.5	ND	81.4	70-130			
C12-C16 Aromatics	11.4	5.00	"	10.9	4.88	59.8	70-130			Q-01
C16-C21 Aromatics	16.9	5.00	"	18.2	ND	92.9	70-130			
C21-C34 Aromatics	26.2	5.00	"	29.1	1.73	84.1	70-130			
Surrogate: o-Terphenyl	*13.3*		*"*	*14.5*		*91.7*	*60-140*			
Surrogate: 1-Chlorooctadecane	*13.2*		*"*	*14.5*		*91.0*	*60-140*			
Matrix Spike Dup (4D16012-MSD1)					**Source: B4D0119-10**					
C8-C10 Aliphatics	10.4	5.00	mg/kg dry	9.09	0.918	104	70-130	0.966	25	
C10-C12 Aliphatics	3.81	5.00	"	3.64	0.346	95.2	70-130	4.56	25	
C12-C16 Aliphatics	6.63	5.00	"	7.27	ND	91.2	70-130	1.21	25	
C16-C21 Aliphatics	7.29	5.00	"	7.27	ND	100	70-130	0.275	25	
C21-C34 Aliphatics	25.6	5.00	"	25.4	2.39	91.4	70-130	6.43	25	
C8-C10 Aromatics	22.1	5.00	"	58.2	ND	38.0	70-130	0.454	25	Q-01
C10-C12 Aromatics	11.6	5.00	"	14.5	ND	80.0	70-130	1.71	25	
C12-C16 Aromatics	11.3	5.00	"	10.9	4.88	58.9	70-130	0.881	25	Q-01
C16-C21 Aromatics	17.0	5.00	"	18.2	ND	93.4	70-130	0.590	25	
C21-C34 Aromatics	26.1	5.00	"	29.1	1.73	83.7	70-130	0.382	25	
Surrogate: o-Terphenyl	*13.3*		*"*	*14.5*		*91.7*	*60-140*			
Surrogate: 1-Chlorooctadecane	*13.6*		*"*	*14.5*		*93.8*	*60-140*			

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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D12024: Prepared 04/12/04 Using EPA 3050B										
Blank (4D12024-BLK1)										
Cadmium	ND	0.500	mg/kg							
Chromium	ND	0.500	"							
Lead	ND	0.500	"							
LCS (4D12024-BS1)										
Cadmium	37.6	0.500	mg/kg	39.6		94.9	80-120			
Chromium	38.5	0.500	"	39.6		97.2	80-120			
Lead	38.3	0.500	"	39.6		96.7	80-120			
LCS Dup (4D12024-BSD1)										
Cadmium	37.6	0.500	mg/kg	39.2		95.9	80-120	0.00	20	
Chromium	38.0	0.500	"	39.2		96.9	80-120	1.31	20	
Lead	38.1	0.500	"	39.2		97.2	80-120	0.524	20	
Matrix Spike (4D12024-MS1)					**Source: B4D0239-01**					
Cadmium	39.6	0.500	mg/kg dry	41.7	0.156	94.6	70-130			
Chromium	48.0	0.500	"	41.7	8.98	93.6	53-147			
Lead	42.0	0.500	"	41.7	2.32	95.2	62-137			
Matrix Spike Dup (4D12024-MSD1)					**Source: B4D0239-01**					
Cadmium	38.0	0.500	mg/kg dry	40.5	0.156	93.4	70-130	4.12	30	
Chromium	47.0	0.500	"	40.5	8.98	93.9	53-147	2.11	30	
Lead	40.9	0.500	"	40.5	2.32	95.3	62-137	2.65	30	
Post Spike (4D12024-PS1)					**Source: B4D0239-01**					
Cadmium	0.0964		ug/ml	0.100	0.000290	96.1	75-125			
Chromium	0.114		"	0.100	0.0167	97.3	75-125			
Lead	0.101		"	0.100	0.00432	96.7	75-125			

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D13014: Prepared 04/13/04 Using EPA 3545										
Blank (4D13014-BLK1)										
Acenaphthene	ND	0.0100	mg/kg							
Acenaphthylene	ND	0.0100	"							
Anthracene	ND	0.0100	"							
Benzo (a) anthracene	ND	0.0100	"							
Benzo (a) pyrene	ND	0.0100	"							
Benzo (b) fluoranthene	ND	0.0100	"							
Benzo (ghi) perylene	ND	0.0100	"							
Benzo (k) fluoranthene	ND	0.0100	"							
Chrysene	ND	0.0100	"							
Dibenz (a,h) anthracene	ND	0.0100	"							
Fluoranthene	ND	0.0100	"							
Fluorene	ND	0.0100	"							
Indeno (1,2,3-cd) pyrene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
Phenanthrene	ND	0.0100	"							
Pyrene	ND	0.0100	"							
Surrogate: p-Terphenyl-d14	*0.243*		*"*	*0.267*		*91.0*	*28-161*			
LCS (4D13014-BS2)										
Acenaphthene	0.274	0.0100	mg/kg	0.333		82.3	53-120			
Acenaphthylene	0.301	0.0100	"	0.333		90.4	52-120			
Anthracene	0.299	0.0100	"	0.333		89.8	39-145			
Benzo (a) anthracene	0.289	0.0100	"	0.333		86.8	64-120			
Benzo (a) pyrene	0.300	0.0100	"	0.333		90.1	65-120			
Benzo (b) fluoranthene	0.301	0.0100	"	0.333		90.4	52-139			
Benzo (ghi) perylene	0.307	0.0100	"	0.333		92.2	54-125			
Benzo (k) fluoranthene	0.292	0.0100	"	0.333		87.7	47-138			
Chrysene	0.286	0.0100	"	0.333		85.9	57-120			
Dibenz (a,h) anthracene	0.304	0.0100	"	0.333		91.3	52-120			
Fluoranthene	0.322	0.0100	"	0.333		96.7	61-128			
Fluorene	0.297	0.0100	"	0.333		89.2	63-120			
Indeno (1,2,3-cd) pyrene	0.320	0.0100	"	0.333		96.1	54-128			
Naphthalene	0.278	0.0100	"	0.333		83.5	54-120			
Phenanthrene	0.278	0.0100	"	0.333		83.5	28-120			
Pyrene	0.267	0.0100	"	0.333		80.2	59-124			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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907.563.9200 fax 907.563.9210

ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D13014: Prepared 04/13/04 Using EPA 3545										
LCS (4D13014-BS2)										
Surrogate: p-Terphenyl-d14	*0.217*		*mg/kg*	*0.267*		*81.3*	*28-161*			
LCS Dup (4D13014-BSD2)										
Acenaphthene	0.282	0.0100	mg/kg	0.333		84.7	53-120	2.88	40	
Acenaphthylene	0.309	0.0100	"	0.333		92.8	52-120	2.62	40	
Anthracene	0.304	0.0100	"	0.333		91.3	39-145	1.66	40	
Benzo (a) anthracene	0.313	0.0100	"	0.333		94.0	64-120	7.97	40	
Benzo (a) pyrene	0.329	0.0100	"	0.333		98.8	65-120	9.22	40	
Benzo (b) fluoranthene	0.321	0.0100	"	0.333		96.4	52-139	6.43	40	
Benzo (ghi) perylene	0.359	0.0100	"	0.333		108	54-125	15.6	40	
Benzo (k) fluoranthene	0.310	0.0100	"	0.333		93.1	47-138	5.98	40	
Chrysene	0.309	0.0100	"	0.333		92.8	57-120	7.73	37	
Dibenz (a,h) anthracene	0.351	0.0100	"	0.333		105	52-120	14.4	40	
Fluoranthene	0.337	0.0100	"	0.333		101	61-128	4.55	40	
Fluorene	0.303	0.0100	"	0.333		91.0	63-120	2.00	43	
Indeno (1,2,3-cd) pyrene	0.370	0.0100	"	0.333		111	54-128	14.5	39	
Naphthalene	0.285	0.0100	"	0.333		85.6	54-120	2.49	40	
Phenanthrene	0.286	0.0100	"	0.333		85.9	28-120	2.84	40	
Pyrene	0.265	0.0100	"	0.333		79.6	59-124	0.752	40	
Surrogate: p-Terphenyl-d14	*0.217*		*"*	*0.267*		*81.3*	*28-161*			
Matrix Spike (4D13014-MS2)					**Source: B4D0239-02**					
Acenaphthene	0.523	0.100	mg/kg dry	0.340	0.238	83.8	41-120			
Acenaphthylene	0.319	0.100	"	0.340	ND	93.8	46-120			
Anthracene	0.714	0.100	"	0.340	0.143	168	23-151			Q-01
Benzo (a) anthracene	1.51	0.100	"	0.340	1.24	79.4	44-124			
Benzo (a) pyrene	0.516	0.100	"	0.340	0.775	-76.2	21-138			Q-03
Benzo (b) fluoranthene	0.822	0.100	"	0.340	0.367	134	32-139			
Benzo (ghi) perylene	0.299	0.100	"	0.340	0.170	37.9	20-140			
Benzo (k) fluoranthene	1.01	0.100	"	0.340	0.442	167	23-138			Q-03
Chrysene	1.53	0.100	"	0.340	1.25	82.4	33-126			
Dibenz (a,h) anthracene	0.306	0.100	"	0.340	0.0951	62.0	26-125			
Fluoranthene	0.768	0.100	"	0.340	0.387	112	36-141			
Fluorene	0.421	0.100	"	0.340	0.0883	97.9	46-126			
Indeno (1,2,3-cd) pyrene	0.258	0.100	"	0.340	0.0748	53.9	24-138			

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D13014: Prepared 04/13/04 Using EPA 3545										
Matrix Spike (4D13014-MS2)					**Source: B4D0239-02**					
Naphthalene	0.272	0.100	mg/kg dry	0.340	ND	80.0	35-120			
Phenanthrene	0.639	0.100	"	0.340	0.319	94.1	29-140			
Pyrene	1.92	0.100	"	0.340	1.74	52.9	27-143			
Surrogate: p-Terphenyl-d14	*0.204*		*"*	*0.272*		*75.0*	*28-161*			
Matrix Spike Dup (4D13014-MSD2)					**Source: B4D0239-02**					
Acenaphthene	0.428	0.100	mg/kg dry	0.340	0.238	55.9	41-120	20.0	50	
Acenaphthylene	0.326	0.100	"	0.340	ND	95.9	46-120	2.17	50	
Anthracene	0.401	0.100	"	0.340	0.143	75.9	23-151	56.1	50	Q-07
Benzo (a) anthracene	1.07	0.100	"	0.340	1.24	-50.0	44-124	34.1	50	Q-03
Benzo (a) pyrene	0.449	0.100	"	0.340	0.775	-95.9	21-138	13.9	50	Q-03
Benzo (b) fluoranthene	0.496	0.100	"	0.340	0.367	37.9	32-139	49.5	50	
Benzo (ghi) perylene	0.299	0.100	"	0.340	0.170	37.9	20-140	0.00	50	
Benzo (k) fluoranthene	0.605	0.100	"	0.340	0.442	47.9	23-138	50.2	50	
Chrysene	1.08	0.100	"	0.340	1.25	-50.0	33-126	34.5	44	
Dibenz (a,h) anthracene	0.333	0.100	"	0.340	0.0951	70.0	26-125	8.45	50	
Fluoranthene	0.598	0.100	"	0.340	0.387	62.1	36-141	24.9	50	
Fluorene	0.381	0.100	"	0.340	0.0883	86.1	46-126	9.98	52	
Indeno (1,2,3-cd) pyrene	0.299	0.100	"	0.340	0.0748	65.9	24-138	14.7	43	
Naphthalene	0.279	0.100	"	0.340	ND	82.1	35-120	2.54	50	
Phenanthrene	0.516	0.100	"	0.340	0.319	57.9	29-140	21.3	50	
Pyrene	1.34	0.100	"	0.340	1.74	-118	27-143	35.6	50	
Surrogate: p-Terphenyl-d14	*0.217*		*"*	*0.272*		*79.8*	*28-161*			

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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ERM-Bellevue	Project: Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number: 5559.00	**Reported:**
Bellevue, WA 98005	Project Manager: Rob Leet	04/29/04 14:42

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4D12042: Prepared 04/12/04 Using Dry Weight										
Blank (4D12042-BLK1)										
Dry Weight	99.7	1.00	%							

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ERM-Bellevue	Project:	Atofina-Portland, Old Caustic Tank Farm	
915-118th Avenue S.E., Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Rob Leet	04/29/04 14:42

Notes and Definitions

Q-01	The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
Q-02	The spike recovery for this QC sample is outside of NCA established control limits due to sample matrix interference.
Q-03	The percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte already present in the sample.
Q-07	The RPD value for this QC sample is above the established control limit. Review of associated QC indicates the high RPD does not represent an out-of-control condition for the batch.
Q-16	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to interference from coeluting organic compounds present in the sample.
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
X	See case narrative.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

24 February, 2004

Erik Ipsen
ERM (Bellevue)
915 118th Ave. SE, Suite 130
Bellevue, WA 98005

RE: Atofina

Enclosed are the results of analyses for samples received by the laboratory on 01/30/04 17:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa Domenighini
Project Manager

Work Orders included in this report:

P4B0008

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/24/04 13:21

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OCTF-10-0.5	P4B0008-01	Soil	01/27/04 16:00	01/30/04 17:15
OCTF-10-1.0	P4B0008-02	Soil	01/27/04 16:05	01/30/04 17:15
OCTF-11-0.5	P4B0008-03	Soil	01/27/04 16:15	01/30/04 17:15
OCTF-11-1.0	P4B0008-04	Soil	01/27/04 16:20	01/30/04 17:15
OCTF-12-0.5	P4B0008-05	Soil	01/27/04 16:25	01/30/04 17:15
OCTF-12-1.0	P4B0008-06	Soil	01/27/04 16:30	01/30/04 17:15
OCTF-13-0.5	P4B0008-07	Soil	01/27/04 16:35	01/30/04 17:15
OCTF-13-1.0	P4B0008-08	Soil	01/27/04 16:40	01/30/04 17:15

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/24/04 13:21

Organochlorine Pesticides per EPA Method 8081A

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-10-0.5 (P4B0008-01) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	**17.6**	17.5	ug/kg dry	5	EPA 8081A	02/05/04	02/17/04	4020181	R-07, T-03
4,4´-DDE	**167**	67.0	"	10	"	"	02/16/04	"	R-05, T-03
4,4´-DDT	**715**	134	"	20	"	"	02/17/04	"	R-05
Surr: Decachlorobiphenyl	*96.2 %*	*16-149*							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*90.3 %*	*36-140*							
OCTF-10-1.0 (P4B0008-02) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	**18.4**	17.5	ug/kg dry	5	EPA 8081A	02/05/04	02/17/04	4020181	R-07, T-03
4,4´-DDE	**95.6**	67.0	"	10	"	"	02/16/04	"	R-05, T-03
4,4´-DDT	**1340**	134	"	20	"	"	02/17/04	"	R-05
Surr: Decachlorobiphenyl	*92.9 %*	*16-149*							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*95.8 %*	*36-140*							
OCTF-11-0.5 (P4B0008-03) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	**360000**	335000	ug/kg dry	50000	EPA 8081A	02/05/04	02/17/04	4020181	R-05, T-03
4,4´-DDE	**18200000**	3350000	"	500000	"	"	02/16/04	"	R-05, T-03
4,4´-DDT	**13300000**	3350000	"	"	"	"	02/17/04	"	R-05
Surr: Decachlorobiphenyl	*NR*	*16-149*							*S-01*
Surr: 2,4,5,6-Tetrachloro-m-xylene	*NR*	*36-140*							*S-01*
OCTF-11-1.0 (P4B0008-04) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	ND	3350000	ug/kg dry	500000	EPA 8081A	02/05/04	02/16/04	4020181	R-05
4,4´-DDE	**12300000**	3350000	"	"	"	"	"	"	R-05
4,4´-DDT	ND	3350000	"	"	"	"	"	"	R-05
Surr: Decachlorobiphenyl	*NR*	*16-149*							*S-01*
Surr: 2,4,5,6-Tetrachloro-m-xylene	*NR*	*36-140*							*S-01*

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/24/04 13:21

Organochlorine Pesticides per EPA Method 8081A

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-12-0.5 (P4B0008-05) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	**208**	200	ug/kg dry	50	EPA 8081A	02/05/04	02/17/04	4020181	R-07, T-03
4,4´-DDE	**5280**	3350	"	500	"	"	02/17/04	"	R-05, T-03
4,4´-DDT	**5710**	670	"	100	"	"	02/17/04	"	R-05
Surr: Decachlorobiphenyl	*NR*	*16-149*							*S-01*
Surr: 2,4,5,6-Tetrachloro-m-xylene	*NR*	*36-140*							*S-01*
OCTF-12-1.0 (P4B0008-06) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	**21.5**	20.0	ug/kg dry	5	EPA 8081A	02/05/04	02/15/04	4020181	R-05, R-07
4,4´-DDE	**664**	67.0	"	10	"	"	02/15/04	"	R-05
4,4´-DDT	**164**	33.5	"	5	"	"	02/15/04	"	R-05
Surr: Decachlorobiphenyl	*106 %*	*16-149*							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*98.3 %*	*36-140*							
OCTF-13-0.5 (P4B0008-07) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	**144**	67.0	ug/kg dry	10	EPA 8081A	02/05/04	02/15/04	4020181	R-05, T-03
4,4´-DDE	**7870**	1340	"	200	"	"	02/17/04	"	C-08, R-05
4,4´-DDT	**672**	67.0	"	10	"	"	02/15/04	"	R-05
Surr: Decachlorobiphenyl	*109 %*	*16-149*							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*100 %*	*36-140*							
OCTF-13-1.0 (P4B0008-08) Soil					Sampled: 01/27/04	Received: 01/30/04			
4,4´-DDD	**248**	134	ug/kg dry	20	EPA 8081A	02/05/04	02/15/04	4020181	R-05, T-03
4,4´-DDE	**14600**	1340	"	200	"	"	02/15/04	"	R-05
4,4´-DDT	**6740**	1340	"	"	"	"	"	"	R-05
Surr: Decachlorobiphenyl	*101 %*	*16-149*							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*93.4 %*	*36-140*							*J*

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/24/04 13:21

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-10-0.5 (P4B0008-01) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**85.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-10-1.0 (P4B0008-02) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**88.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-11-0.5 (P4B0008-03) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**72.9**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-11-1.0 (P4B0008-04) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**72.4**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-12-0.5 (P4B0008-05) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**86.0**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-12-1.0 (P4B0008-06) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**79.7**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-13-0.5 (P4B0008-07) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**80.0**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-13-1.0 (P4B0008-08) Soil					Sampled: 01/27/04	Received: 01/30/04			
% Solids	**81.2**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/24/04 13:21

Organochlorine Pesticides per EPA Method 8081A - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020181 - EPA 3550										
Blank (4020181-BLK1)				Prepared: 02/05/04	Analyzed: 02/10/04					
4,4´-DDD	ND	6.70	ug/kg							
4,4´-DDE	ND	6.70	"							
4,4´-DDT	ND	6.70	"							
Surr: Decachlorobiphenyl	*29.7*		"	*33.3*		*89.2*	*16-149*			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*29.6*		"	*33.3*		*88.9*	*36-140*			
LCS (4020181-BS1)				Prepared: 02/05/04	Analyzed: 02/10/04					
4,4´-DDT	27.1	6.70	ug/kg	33.3		81.4	65-130			
Surr: Decachlorobiphenyl	*31.6*		"	*33.3*		*94.9*	*16-149*			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*29.7*		"	*33.3*		*89.2*	*36-140*			
Matrix Spike (4020181-MS1)		**Source: P4A0656-05**		Prepared: 02/05/04	Analyzed: 02/10/04					
4,4´-DDT	90.1	20.1	ug/kg dry	38.6	62.6	71.2	65-130			
Surr: Decachlorobiphenyl	*31.4*		"	*38.6*		*81.3*	*16-149*			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*34.1*		"	*38.6*		*88.3*	*36-140*			
Matrix Spike Dup (4020181-MSD1)		**Source: P4A0656-05**		Prepared: 02/05/04	Analyzed: 02/10/04					
4,4´-DDT	82.0	20.1	ug/kg dry	38.6	62.6	50.3	65-130	9.41	50	Q-01
Surr: Decachlorobiphenyl	*32.3*		"	*38.6*		*83.7*	*16-149*			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*37.8*		"	*38.6*		*97.9*	*36-140*			

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/24/04 13:21

Percent Dry Weight (Solids) per Standard Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020206 - Dry Weight										
Duplicate (4020206-DUP1)		**Source: P4B0008-06**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	79.6	1.00% by Weight			79.7			0.126	20	
Duplicate (4020206-DUP2)		**Source: P4B0015-04**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	75.1	1.00% by Weight			75.4			0.399	20	
Duplicate (4020206-DUP3)		**Source: P4B0029-02**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	93.8	1.00% by Weight			93.8			0.00	20	
Duplicate (4020206-DUP4)		**Source: P4B0108-01**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	96.5	1.00% by Weight			96.2			0.311	20	
Duplicate (4020206-DUP5)		**Source: P4B0109-02**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	93.3	1.00% by Weight			93.3			0.00	20	
Duplicate (4020206-DUP6)		**Source: P4B0109-03**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	94.0	1.00% by Weight			93.7			0.320	20	

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/24/04 13:21

Notes and Definitions

C-08	Ending calibration check standard for confirmation column was 74.509%.
J	Estimated value.
Q-01	The spike recovery, and/or RPD, for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
R-05	Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.
R-07	Reporting limit raised due to dilution necessary for analysis. Reporting limit adjusted to report quantitation below the MRL, but within the calibration range.
S-01	The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
T-03	The RPD between results from different column or detector exceeded 40%. The data has been evaluated and the lower result has been reported.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

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541.383.9310 fax 541.382.7588

23 February, 2004

Erik Ipsen
ERM (Bellevue)
915 118th Ave. SE, Suite 130
Bellevue, WA 98005

RE: Atofina

Enclosed are the results of analyses for samples received by the laboratory on 01/30/04 07:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa Domenighini
Project Manager

Work Orders included in this report:
P4B0013

P4B0013

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OCTF-2-0.5	P4B0013-01	Soil	01/28/04 10:10	01/30/04 07:15
OCTF-2-1.0	P4B0013-02	Soil	01/28/04 10:20	01/30/04 07:15
OCTF-1-0.5	P4B0013-03	Soil	01/28/04 10:50	01/30/04 07:15
OCTF-1-1.0	P4B0013-04	Soil	01/28/04 11:10	01/30/04 07:15
OCTF-4-0.5	P4B0013-05	Soil	01/28/04 11:50	01/30/04 07:15
OCTF-4-1.0	P4B0013-06	Soil	01/28/04 12:05	01/30/04 07:15
OCTF-5-0.5	P4B0013-07	Soil	01/28/04 13:40	01/30/04 07:15
OCTF-5-1.0	P4B0013-08	Soil	01/28/04 13:50	01/30/04 07:15
OCTF-3-0.5	P4B0013-09	Soil	01/28/04 13:10	01/30/04 07:15
OCTF-3-1.0	P4B0013-10	Soil	01/28/04 13:20	01/30/04 07:15
OCTF-6-0.5	P4B0013-11	Soil	01/28/04 14:35	01/30/04 07:15
OCTF-6-1.0	P4B0013-12	Soil	01/28/04 14:50	01/30/04 07:15
OCTF-7-0.5	P4B0013-13	Soil	01/28/04 15:00	01/30/04 07:15
OCTF-7-1.0	P4B0013-14	Soil	01/28/04 15:10	01/30/04 07:15
OCTF-8-0.5	P4B0013-15	Soil	01/28/04 15:20	01/30/04 07:15
OCTF-8-1.0	P4B0013-16	Soil	01/28/04 15:30	01/30/04 07:15
OCTF-9-0.5	P4B0013-17	Soil	01/28/04 15:40	01/30/04 07:15
OCTF-9-1.0	P4B0013-18	Soil	01/28/04 15:50	01/30/04 07:15

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-2-0.5 (P4B0013-01) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**661**	250	mg/kg dry	10	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	**3600**	500	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*89.8 %*	*50-150*							
OCTF-2-1.0 (P4B0013-02) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**573**	50.0	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*78.8 %*	*50-150*							
OCTF-1-0.5 (P4B0013-03) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**2840**	500	mg/kg dry	20	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**4750**	1000	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*NR*	*50-150*							*S-01*
OCTF-1-1.0 (P4B0013-04) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**1470**	500	mg/kg dry	20	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**3620**	1000	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*NR*	*50-150*							*S-01*
OCTF-4-0.5 (P4B0013-05) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**749**	125	mg/kg dry	5	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	**3450**	250	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*101 %*	*50-150*							
OCTF-4-1.0 (P4B0013-06) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**650**	125	mg/kg dry	5	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	**2860**	250	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*97.3 %*	*50-150*							

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-5-0.5 (P4B0013-07) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**1910**	500	mg/kg dry	20	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**3210**	1000	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*NR*	*50-150*							*S-01*
OCTF-5-1.0 (P4B0013-08) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**652**	460	mg/kg dry	20	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**1320**	960	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*NR*	*50-150*							*S-01*
OCTF-3-0.5 (P4B0013-09) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**1790**	500	mg/kg dry	20	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**2550**	1000	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*NR*	*50-150*							*S-01*
OCTF-3-1.0 (P4B0013-10) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**2150**	500	mg/kg dry	20	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**2340**	1000	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*NR*	*50-150*							*S-01*
OCTF-6-0.5 (P4B0013-11) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**805**	250	mg/kg dry	10	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	**3460**	500	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*112 %*	*50-150*							
OCTF-6-1.0 (P4B0013-12) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**246**	50.0	mg/kg dry	2	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	**873**	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*102 %*	*50-150*							

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-7-0.5 (P4B0013-13) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**777**	500	mg/kg dry	20	NWTPH-Dx	02/05/04	02/05/04	4020177	
Heavy Oil Range Hydrocarbons	**770**	680	"	"	"	"	"	"	D-15
Surr: 1-Chlorooctadecane	*NR*	*50-150*							*S-01*
OCTF-7-1.0 (P4B0013-14) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	**63.5**	50.0	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*81.4 %*	*50-150*							
OCTF-8-0.5 (P4B0013-15) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*82.2 %*	*50-150*							
OCTF-8-1.0 (P4B0013-16) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	02/05/04	02/06/04	4020177	
Heavy Oil Range Hydrocarbons	**56.0**	50.0	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*94.0 %*	*50-150*							
OCTF-9-0.5 (P4B0013-17) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**514**	125	mg/kg dry	5	NWTPH-Dx	02/05/04	02/06/04	4020177	D-17
Heavy Oil Range Hydrocarbons	**1580**	250	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*104 %*	*50-150*							
OCTF-9-1.0 (P4B0013-18) Soil					Sampled: 01/28/04	Received: 01/30/04			
Diesel Range Organics	**817**	250	mg/kg dry	10	NWTPH-Dx	02/05/04	02/06/04	4020177	D-17
Heavy Oil Range Hydrocarbons	**3480**	500	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*109 %*	*50-150*							

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-2-0.5 (P4B0013-01) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**39600**	6700	ug/kg dry	1000	8081A/8082	02/05/04	02/15/04	4020182	R-05, T-03
4,4´-DDE	**5950**	5000	"	"	"	"	"	"	R-07, T-03
4,4´-DDT	**17700**	6700	"	"	"	"	"	"	R-05
Aroclor 1016	ND	335	"	5	"	"	02/11/04	"	R-05
Aroclor 1221	ND	670	"	"	"	"	"	"	R-05
Aroclor 1232	ND	335	"	"	"	"	"	"	R-05
Aroclor 1242	ND	335	"	"	"	"	"	"	R-05
Aroclor 1248	ND	6700	"	"	"	"	"	"	R-03, R-05
Aroclor 1254	ND	6700	"	"	"	"	"	"	R-03, R-05
Aroclor 1260	ND	335	"	"	"	"	"	"	R-05
Surr: 2,4,5,6-Tetrachloro-m-xylene	*NR*	*36-140*							*S-01*
Surr: Decachlorobiphenyl	*99.5 %*	*16-149*							
OCTF-2-1.0 (P4B0013-02) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**4590**	1340	ug/kg dry	200	8081A/8082	02/05/04	02/17/04	4020182	R-05, T-03
4,4´-DDE	**480**	134	"	20	"	"	02/17/04	"	R-05
4,4´-DDT	**1810**	1340	"	200	"	"	02/17/04	"	R-05, T-03
Aroclor 1016	ND	335	"	5	"	"	02/11/04	"	R-05
Aroclor 1221	ND	670	"	"	"	"	"	"	R-05
Aroclor 1232	ND	335	"	"	"	"	"	"	R-05
Aroclor 1242	ND	335	"	"	"	"	"	"	R-05
Aroclor 1248	ND	1680	"	"	"	"	"	"	R-03, R-05
Aroclor 1254	ND	1680	"	"	"	"	"	"	R-03, R-05
Aroclor 1260	ND	335	"	"	"	"	"	"	R-05
Surr: 2,4,5,6-Tetrachloro-m-xylene	*NR*	*36-140*							*S-01*
Surr: Decachlorobiphenyl	*84.8 %*	*16-149*							

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-1-0.5 (P4B0013-03) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**49.5**	6.70	ug/kg dry	1	8081A/8082	02/05/04	02/17/04	4020182	
4,4´-DDE	**56.4**	6.70	"	"	"	"	"	"	
4,4´-DDT	**291**	134	"	20	"	"	02/17/04	"	R-05, T-02
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*83.9 %*	*36-140*							*J*
Surr: Decachlorobiphenyl	*70.6 %*	*16-149*							
OCTF-1-1.0 (P4B0013-04) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**27.5**	25.0	ug/kg dry	5	8081A/8082	02/05/04	02/15/04	4020182	R-07, T-03
4,4´-DDE	**23.5**	22.5	"	"	"	"	"	"	R-07
4,4´-DDT	**81.5**	33.5	"	"	"	"	"	"	R-05
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*90.9 %*	*36-140*							
Surr: Decachlorobiphenyl	*70.1 %*	*16-149*							

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-4-0.5 (P4B0013-05) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**16.7**	6.70	ug/kg dry	1	8081A/8082	02/05/04	02/15/04	4020182	T-03
4,4´-DDE	**18.9**	6.70	"	"	"	"	"	"	T-03
4,4´-DDT	**57.5**	6.70	"	"	"	"	"	"	
Aroclor 1016	ND	67.0	"	"	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*88.8 %*	*36-140*							
Surr: Decachlorobiphenyl	*73.3 %*	*16-149*							
OCTF-4-1.0 (P4B0013-06) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**7910**	1340	ug/kg dry	200	8081A/8082	02/05/04	02/17/04	4020182	R-05, T-02
4,4´-DDE	**1160**	1000	"	"	"	"	"	"	R-05, R-07
4,4´-DDT	**1100**	1000	"	"	"	"	"	"	R-05, R-07, T-02
Aroclor 1016	ND	335	"	5	"	"	02/11/04	"	R-05
Aroclor 1221	ND	670	"	"	"	"	"	"	R-05
Aroclor 1232	ND	335	"	"	"	"	"	"	R-05
Aroclor 1242	ND	335	"	"	"	"	"	"	R-05
Aroclor 1248	ND	6700	"	"	"	"	"	"	R-03, R-05
Aroclor 1254	ND	6700	"	"	"	"	"	"	R-03, R-05
Aroclor 1260	ND	335	"	"	"	"	"	"	R-05
Surr: 2,4,5,6-Tetrachloro-m-xylene	*NR*	*36-140*							*S-01*
Surr: Decachlorobiphenyl	*78.3 %*	*16-149*							

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-5-0.5 (P4B0013-07) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**10.0**	6.70	ug/kg dry	1	8081A/8082	02/05/04	02/15/04	4020182	T-03
4,4´-DDE	**15.8**	6.70	"	"	"	"	"	"	T-03
4,4´-DDT	ND	6.70	"	"	"	"	"	"	
Aroclor 1016	ND	67.0	"	"	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*55.6 %*	*36-140*							
Surr: Decachlorobiphenyl	*41.1 %*	*16-149*							
OCTF-5-1.0 (P4B0013-08) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	ND	6.70	ug/kg dry	1	8081A/8082	02/05/04	02/15/04	4020182	
4,4´-DDE	**11.8**	6.70	"	"	"	"	"	"	T-03
4,4´-DDT	ND	6.70	"	"	"	"	"	"	
Aroclor 1016	ND	67.0	"	"	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*43.8 %*	*36-140*							
Surr: Decachlorobiphenyl	*41.2 %*	*16-149*							

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-3-0.5 (P4B0013-09) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**99.9**	67.0	ug/kg dry	10	8081A/8082	02/05/04	02/17/04	4020182	R-05, T-02
4,4´-DDE	ND	67.0	"	"	"	"	"	"	R-05
4,4´-DDT	**10.9**	6.70	"	1	"	"	02/17/04	"	T-02
Aroclor 1016	ND	67.0	"	"	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*52.5 %*	*36-140*							
Surr: Decachlorobiphenyl	*46.2 %*	*16-149*							
OCTF-3-1.0 (P4B0013-10) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**362**	134	ug/kg dry	20	8081A/8082	02/05/04	02/17/04	4020182	R-05
4,4´-DDE	**132**	130	"	"	"	"	"	"	R-07
4,4´-DDT	**187**	134	"	"	"	"	"	"	R-05
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	335	"	"	"	"	"	"	R-03
Aroclor 1254	ND	335	"	"	"	"	"	"	R-03
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*39.3 %*	*36-140*							
Surr: Decachlorobiphenyl	*43.3 %*	*16-149*							

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-6-0.5 (P4B0013-11) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**49.9**	33.5	ug/kg dry	5	8081A/8082	02/05/04	02/17/04	4020182	R-05
4,4´-DDE	**42.9**	33.5	"	"	"	"	"	"	R-05
4,4´-DDT	**93.2**	33.5	"	"	"	"	"	"	R-05, T-02
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*53.8 %*	*36-140*							
Surr: Decachlorobiphenyl	*44.6 %*	*16-149*							
OCTF-6-1.0 (P4B0013-12) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**26.7**	25.0	ug/kg dry	5	8081A/8082	02/05/04	02/15/04	4020182	R-07
4,4´-DDE	**68.6**	33.5	"	"	"	"	"	"	R-05, T-02
4,4´-DDT	**21.5**	20.0	"	"	"	"	"	"	R-07
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*58.0 %*	*36-140*							
Surr: Decachlorobiphenyl	*50.0 %*	*16-149*							

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-7-0.5 (P4B0013-13) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	ND	6.70	ug/kg dry	1	8081A/8082	02/05/04	02/17/04	4020182	
4,4´-DDE	**226**	67.0	"	10	"	"	02/17/04	"	R-05
4,4´-DDT	**23.8**	6.70	"	1	"	"	02/17/04	"	
Aroclor 1016	ND	67.0	"	"	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*56.9 %*	*36-140*							
Surr: Decachlorobiphenyl	*45.7 %*	*16-149*							
OCTF-7-1.0 (P4B0013-14) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**131**	67.0	ug/kg dry	10	8081A/8082	02/05/04	02/17/04	4020182	R-05
4,4´-DDE	**2990**	1340	"	200	"	"	02/17/04	"	R-05
4,4´-DDT	ND	670	"	100	"	"	02/19/04	"	R-05
Aroclor 1016	ND	335	"	5	"	"	02/11/04	"	R-05
Aroclor 1221	ND	670	"	"	"	"	"	"	R-05
Aroclor 1232	ND	335	"	"	"	"	"	"	R-05
Aroclor 1242	ND	335	"	"	"	"	"	"	R-05
Aroclor 1248	ND	1680	"	"	"	"	"	"	R-03, R-05
Aroclor 1254	ND	1680	"	"	"	"	"	"	R-03, R-05
Aroclor 1260	ND	335	"	"	"	"	"	"	R-05
Surr: 2,4,5,6-Tetrachloro-m-xylene	*NR*	*36-140*							*S-01*
Surr: Decachlorobiphenyl	*86.3 %*	*16-149*							

North Creek Analytical - Portland

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Lisa Domenighini, Project Manager

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-8-0.5 (P4B0013-15) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**28.3**	25.0	ug/kg dry	10	8081A/8082	02/05/04	02/15/04	4020182	R-07
4,4´-DDE	**45.4**	45.0	"	"	"	"	"	"	R-07
4,4´-DDT	**94.1**	67.0	"	"	"	"	"	"	R-05
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*70.9 %*	*36-140*							
Surr: Decachlorobiphenyl	*80.2 %*	*16-149*							
OCTF-8-1.0 (P4B0013-16) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	ND	6.70	ug/kg dry	1	8081A/8082	02/05/04	02/15/04	4020182	
4,4´-DDE	**16.3**	6.70	"	"	"	"	"	"	T-03
4,4´-DDT	**37.1**	6.70	"	"	"	"	"	"	
Aroclor 1016	ND	67.0	"	"	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*96.3 %*	*36-140*							
Surr: Decachlorobiphenyl	*84.9 %*	*16-149*							

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-9-0.5 (P4B0013-17) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**47.4**	33.5	ug/kg dry	5	8081A/8082	02/05/04	02/15/04	4020182	R-05, T-03
4,4´-DDE	**21.3**	20.0	"	"	"	"	"	"	R-07
4,4´-DDT	**36.7**	33.5	"	"	"	"	"	"	R-05
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*86.8 %*	*36-140*							
Surr: Decachlorobiphenyl	*80.4 %*	*16-149*							
OCTF-9-1.0 (P4B0013-18) Soil					Sampled: 01/28/04	Received: 01/30/04			
4,4´-DDD	**77.4**	67.0	ug/kg dry	10	8081A/8082	02/05/04	02/15/04	4020182	R-05, T-03
4,4´-DDE	**35.4**	35.0	"	"	"	"	"	"	R-07
4,4´-DDT	**48.2**	45.0	"	"	"	"	"	"	R-07
Aroclor 1016	ND	67.0	"	1	"	"	02/11/04	"	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*81.5 %*	*36-140*							
Surr: Decachlorobiphenyl	*64.3 %*	*16-149*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-2-0.5 (P4B0013-01) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**89.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-2-1.0 (P4B0013-02) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**74.7**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-1-0.5 (P4B0013-03) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**90.9**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-1-1.0 (P4B0013-04) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**91.6**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-4-0.5 (P4B0013-05) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**93.5**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-4-1.0 (P4B0013-06) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**86.2**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-5-0.5 (P4B0013-07) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**78.0**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-5-1.0 (P4B0013-08) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**72.7**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-3-0.5 (P4B0013-09) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**84.6**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5559.50	**Reported:**
Bellevue, WA 98005	Project Manager: Erik Ipsen	02/23/04 17:30

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-3-1.0 (P4B0013-10) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**73.3**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-6-0.5 (P4B0013-11) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**87.9**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-6-1.0 (P4B0013-12) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**76.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-7-0.5 (P4B0013-13) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**88.7**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-7-1.0 (P4B0013-14) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**74.9**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-8-0.5 (P4B0013-15) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**94.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-8-1.0 (P4B0013-16) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**95.2**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-9-0.5 (P4B0013-17) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**93.2**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-9-1.0 (P4B0013-18) Soil					Sampled: 01/28/04	Received: 01/30/04			
% Solids	**90.8**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020177 - EPA 3550 Fuels										
Blank (4020177-BLK1)				Prepared & Analyzed: 02/05/04						
Diesel Range Organics	ND	25.0	mg/kg							
Heavy Oil Range Hydrocarbons	ND	50.0	"							
Surr: 1-Chlorooctadecane	*4.91*		*"*	*4.80*		*102*	*50-150*			
LCS (4020177-BS1)				Prepared & Analyzed: 02/05/04						
Diesel Range Organics	138	25.0	mg/kg	125		110	50-150			
Heavy Oil Range Hydrocarbons	84.6	50.0	"	75.0		113	50-150			
Surr: 1-Chlorooctadecane	*4.34*		*"*	*4.80*		*90.4*	*50-150*			
Duplicate (4020177-DUP1)		**Source: P4B0013-01**		Prepared: 02/05/04 Analyzed: 02/06/04						
Diesel Range Organics	504	250	mg/kg dry		661			27.0	50	
Heavy Oil Range Hydrocarbons	2620	500	"		3600			31.5	50	
Surr: 1-Chlorooctadecane	*5.44*		*"*	*5.38*		*101*	*50-150*			
Duplicate (4020177-DUP2)		**Source: P4B0013-02**		Prepared & Analyzed: 02/05/04						
Diesel Range Organics	ND	25.0	mg/kg dry		ND			NA	50	
Heavy Oil Range Hydrocarbons	737	50.0	"		573			25.0	50	
Surr: 1-Chlorooctadecane	*5.06*		*"*	*6.43*		*78.7*	*50-150*			

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509.924.9200 fax 509.924.9290
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503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Organochlorine Pesticides and PCBs per EPA Methods 8081A/8082 - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020182 - EPA 3550										
Blank (4020182-BLK1)				Prepared: 02/05/04 Analyzed: 02/17/04						
4,4´-DDD	ND	6.70	ug/kg							
4,4´-DDE	ND	6.70	"							
4,4´-DDT	ND	6.70	"							
Aroclor 1016	ND	67.0	"							
Aroclor 1221	ND	134	"							
Aroclor 1232	ND	67.0	"							
Aroclor 1242	ND	67.0	"							
Aroclor 1248	ND	67.0	"							
Aroclor 1254	ND	67.0	"							
Aroclor 1260	ND	67.0	"							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*34.0*		"	*33.3*		*102*	*36-140*			
Surr: Decachlorobiphenyl	*30.8*		"	*33.3*		*92.5*	*16-149*			
LCS (4020182-BS1)				Prepared: 02/05/04 Analyzed: 02/17/04						
4,4´-DDT	33.7	6.70	ug/kg	33.3		101	65-130			Q-23
Surr: 2,4,5,6-Tetrachloro-m-xylene	*29.3*		"	*33.3*		*88.0*	*36-140*			*Q-23*
Surr: Decachlorobiphenyl	*31.7*		"	*33.3*		*95.2*	*16-149*			*Q-23*
LCS (4020182-BS2)				Prepared: 02/05/04 Analyzed: 02/11/04						
Aroclor 1016	306	67.0	ug/kg	333		91.9	57-135			Q-23
Aroclor 1260	314	67.0	"	333		94.3	60-135			Q-23
Surr: 2,4,5,6-Tetrachloro-m-xylene	*33.1*		"	*33.3*		*99.4*	*36-140*			*Q-23*
Surr: Decachlorobiphenyl	*31.4*		"	*33.3*		*94.3*	*16-149*			*Q-23*

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Percent Dry Weight (Solids) per Standard Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020206 - Dry Weight										
Duplicate (4020206-DUP1)		**Source: P4B0008-06**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	79.6	1.00% by Weight			79.7			0.126	20	
Duplicate (4020206-DUP2)		**Source: P4B0015-04**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	75.1	1.00% by Weight			75.4			0.399	20	
Duplicate (4020206-DUP3)		**Source: P4B0029-02**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	93.8	1.00% by Weight			93.8			0.00	20	
Duplicate (4020206-DUP4)		**Source: P4B0108-01**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	96.5	1.00% by Weight			96.2			0.311	20	
Duplicate (4020206-DUP5)		**Source: P4B0109-02**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	93.3	1.00% by Weight			93.3			0.00	20	
Duplicate (4020206-DUP6)		**Source: P4B0109-03**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	94.0	1.00% by Weight			93.7			0.320	20	

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

Notes and Definitions

D-15	Detected hydrocarbons have non-petroleum peaks or elution pattern that suggests the presence of biogenic interference.
D-17	Detected hydrocarbons in the diesel range do not have a distinct diesel pattern and may be due to heavily weathered diesel or possibly biogenic interference.
J	Estimated value.
Q-23	The Matrix Spike/Duplicate for this batch could not be reported. Source sample contains high levels of target analyte, non-target analyte, and/or matrix interference requiring high dilution.
R-03	The reporting limit for this analyte was raised due to matrix interference.
R-05	Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.
R-07	Reporting limit raised due to dilution necessary for analysis. Reporting limit adjusted to report quantitation below the MRL, but within the calibration range.
S-01	The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
T-02	The RPD between results from different column or detector exceeded 40%. The data has been evaluated and the higher result has been reported.
T-03	The RPD between results from different column or detector exceeded 40%. The data has been evaluated and the lower result has been reported.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.50	**Reported:**
Bellevue, WA 98005	Project Manager:	Erik Ipsen	02/23/04 17:30

P4B0015

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OCTF-1-0.5	P4B0015-01	Soil	01/30/04 13:40	01/30/04 17:15
OCTF-1-1.0	P4B0015-02	Soil	01/30/04 13:45	01/30/04 17:15
OCTF-2-0.5	P4B0015-03	Soil	01/30/04 13:55	01/30/04 17:15
OCTF-2-1.0	P4B0015-04	Soil	01/30/04 14:00	01/30/04 17:15
OCTF-4-0.5	P4B0015-05	Soil	01/30/04 14:20	01/30/04 17:15
OCTF-4-1.0	P4B0015-06	Soil	01/30/04 14:30	01/30/04 17:15
OCTF-5-0.5	P4B0015-07	Soil	01/30/04 14:40	01/30/04 17:15
OCTF-5-1.0	P4B0015-08	Soil	01/30/04 14:50	01/30/04 17:15
OCTF-3-0.5	P4B0015-09	Soil	01/30/04 14:15	01/30/04 17:15
OCTF-3-1.0	P4B0015-10	Soil	01/30/04 14:10	01/30/04 17:15
OCTF-6-0.5	P4B0015-11	Soil	01/30/04 15:00	01/30/04 17:15
OCTF-6-1.0	P4B0015-12	Soil	01/30/04 15:05	01/30/04 17:15
OCTF-7-0.5	P4B0015-13	Soil	01/30/04 15:10	01/30/04 17:15
OCTF-7-1.0	P4B0015-14	Soil	01/30/04 15:15	01/30/04 17:15
OCTF-8-0.5	P4B0015-15	Soil	01/30/04 15:20	01/30/04 17:15
OCTF-8-1.0	P4B0015-16	Soil	01/30/04 15:25	01/30/04 17:15
OCTF-9-0.5	P4B0015-17	Soil	01/30/04 15:30	01/30/04 17:15
OCTF-9-1.0	P4B0015-18	Soil	01/30/04 15:40	01/30/04 17:15

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-1-0.5 (P4B0015-01) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-1-0.5 (P4B0015-01) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*92.3 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*102 %*	*57.3-144*							
Surr: Dibromofluoromethane	*96.7 %*	*45.5-130*							
Surr: Toluene-d8	*98.1 %*	*42.1-144*							

North Creek Analytical - Portland

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Lisa Domenighini, Project Manager

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-1-1.0 (P4B0015-02) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-1-1.0 (P4B0015-02) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*90.7 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*99.1 %*	*57.3-144*							
Surr: Dibromofluoromethane	*94.4 %*	*45.5-130*							
Surr: Toluene-d8	*96.7 %*	*42.1-144*							

North Creek Analytical - Portland

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Lisa Domenighini, Project Manager

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-2-0.5 (P4B0015-03) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-2-0.5 (P4B0015-03) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*78.7 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*90.2 %*	*57.3-144*							
Surr: Dibromofluoromethane	*85.5 %*	*45.5-130*							
Surr: Toluene-d8	*87.2 %*	*42.1-144*							

North Creek Analytical - Portland

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Lisa Domenighini, Project Manager

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-2-1.0 (P4B0015-04) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-2-1.0 (P4B0015-04) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*77.4 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*82.6 %*	*57.3-144*							
Surr: Dibromofluoromethane	*78.1 %*	*45.5-130*							
Surr: Toluene-d8	*76.6 %*	*42.1-144*							

North Creek Analytical - Portland

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-4-0.5 (P4B0015-05) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-4-0.5 (P4B0015-05) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*80.6 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*91.1 %*	*57.3-144*							
Surr: Dibromofluoromethane	*85.5 %*	*45.5-130*							
Surr: Toluene-d8	*88.7 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-4-1.0 (P4B0015-06) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-4-1.0 (P4B0015-06) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*81.7 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*90.8 %*	*57.3-144*							
Surr: Dibromofluoromethane	*84.6 %*	*45.5-130*							
Surr: Toluene-d8	*87.9 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-5-0.5 (P4B0015-07) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-5-0.5 (P4B0015-07) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*72.4 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*81.4 %*	*57.3-144*							
Surr: Dibromofluoromethane	*75.9 %*	*45.5-130*							
Surr: Toluene-d8	*78.3 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-5-1.0 (P4B0015-08) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-5-1.0 (P4B0015-08) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*76.6 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*81.7 %*	*57.3-144*							
Surr: Dibromofluoromethane	*76.9 %*	*45.5-130*							
Surr: Toluene-d8	*81.0 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-3-0.5 (P4B0015-09) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-3-0.5 (P4B0015-09) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*85.0 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*92.7 %*	*57.3-144*							
Surr: Dibromofluoromethane	*84.1 %*	*45.5-130*							
Surr: Toluene-d8	*91.4 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-3-1.0 (P4B0015-10) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-3-1.0 (P4B0015-10) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	**125**	100	"	"	"	"	"	"	R-09
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*81.3 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*74.6 %*	*57.3-144*							
Surr: Dibromofluoromethane	*72.2 %*	*45.5-130*							
Surr: Toluene-d8	*74.6 %*	*42.1-144*							

North Creek Analytical - Portland

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Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-6-0.5 (P4B0015-11) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-6-0.5 (P4B0015-11) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*86.3 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*89.0 %*	*57.3-144*							
Surr: Dibromofluoromethane	*86.3 %*	*45.5-130*							
Surr: Toluene-d8	*89.0 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-6-1.0 (P4B0015-12) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-6-1.0 (P4B0015-12) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*77.5 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*66.2 %*	*57.3-144*							
Surr: Dibromofluoromethane	*65.1 %*	*45.5-130*							
Surr: Toluene-d8	*69.1 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-7-0.5 (P4B0015-13) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-7-0.5 (P4B0015-13) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*79.8 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*87.7 %*	*57.3-144*							
Surr: Dibromofluoromethane	*84.2 %*	*45.5-130*							
Surr: Toluene-d8	*88.9 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-7-1.0 (P4B0015-14) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-7-1.0 (P4B0015-14) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*84.2 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*85.0 %*	*57.3-144*							
Surr: Dibromofluoromethane	*80.6 %*	*45.5-130*							
Surr: Toluene-d8	*85.4 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-8-0.5 (P4B0015-15) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-8-0.5 (P4B0015-15) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*95.7 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*103 %*	*57.3-144*							
Surr: Dibromofluoromethane	*100 %*	*45.5-130*							
Surr: Toluene-d8	*105 %*	*42.1-144*							

North Creek Analytical - Portland

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Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-8-1.0 (P4B0015-16) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-8-1.0 (P4B0015-16) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*95.2 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*101 %*	*57.3-144*							
Surr: Dibromofluoromethane	*96.7 %*	*45.5-130*							
Surr: Toluene-d8	*102 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-9-0.5 (P4B0015-17) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-9-0.5 (P4B0015-17) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*91.9 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*100 %*	*57.3-144*							
Surr: Dibromofluoromethane	*97.2 %*	*45.5-130*							
Surr: Toluene-d8	*100 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-9-1.0 (P4B0015-18) Soil					Sampled: 01/30/04	Received: 01/30/04			
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Benzene	ND	100	"	"	"	"	"	"	
Bromobenzene	ND	100	"	"	"	"	"	"	
Bromochloromethane	ND	100	"	"	"	"	"	"	
Bromodichloromethane	ND	100	"	"	"	"	"	"	
Bromoform	ND	100	"	"	"	"	"	"	
Bromomethane	ND	500	"	"	"	"	"	"	
2-Butanone	ND	1000	"	"	"	"	"	"	
n-Butylbenzene	ND	500	"	"	"	"	"	"	
sec-Butylbenzene	ND	100	"	"	"	"	"	"	
tert-Butylbenzene	ND	100	"	"	"	"	"	"	
Carbon disulfide	ND	1000	"	"	"	"	"	"	
Carbon tetrachloride	ND	100	"	"	"	"	"	"	
Chlorobenzene	ND	100	"	"	"	"	"	"	
Chloroethane	ND	100	"	"	"	"	"	"	
Chloroform	ND	100	"	"	"	"	"	"	
Chloromethane	ND	500	"	"	"	"	"	"	
2-Chlorotoluene	ND	100	"	"	"	"	"	"	
4-Chlorotoluene	ND	100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	500	"	"	"	"	"	"	
Dibromochloromethane	ND	100	"	"	"	"	"	"	
1,2-Dibromoethane	ND	100	"	"	"	"	"	"	
Dibromomethane	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	100	"	"	"	"	"	"	
1,2-Dichloroethane	ND	100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	100	"	"	"	"	"	"	

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-9-1.0 (P4B0015-18) Soil					Sampled: 01/30/04	Received: 01/30/04			
trans-1,3-Dichloropropene	ND	100	ug/kg dry	1	EPA 8260B	02/02/04	02/09/04	4020042	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	200	"	"	"	"	"	"	
2-Hexanone	ND	1000	"	"	"	"	"	"	
Isopropylbenzene	ND	200	"	"	"	"	"	"	
p-Isopropyltoluene	ND	200	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	100	"	"	"	"	"	"	
Methylene chloride	ND	500	"	"	"	"	"	"	
Naphthalene	ND	200	"	"	"	"	"	"	
n-Propylbenzene	ND	100	"	"	"	"	"	"	
Styrene	ND	100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	100	"	"	"	"	"	"	
Tetrachloroethene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	100	"	"	"	"	"	"	
Trichloroethene	ND	100	"	"	"	"	"	"	
Trichlorofluoromethane	ND	100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	100	"	"	"	"	"	"	
Vinyl chloride	ND	100	"	"	"	"	"	"	
o-Xylene	ND	100	"	"	"	"	"	"	
m,p-Xylene	ND	200	"	"	"	"	"	"	
Surr: 4-BFB	*82.8 %*	*42.6-130*							
Surr: 1,2-DCA-d4	*89.9 %*	*57.3-144*							
Surr: Dibromofluoromethane	*85.3 %*	*45.5-130*							
Surr: Toluene-d8	*86.1 %*	*42.1-144*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-1-0.5 (P4B0015-01) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**95.8**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-1-1.0 (P4B0015-02) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**92.8**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-2-0.5 (P4B0015-03) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**84.9**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-2-1.0 (P4B0015-04) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**75.4**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-4-0.5 (P4B0015-05) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**80.6**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-4-1.0 (P4B0015-06) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**83.2**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-5-0.5 (P4B0015-07) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**69.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-5-1.0 (P4B0015-08) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**69.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-3-0.5 (P4B0015-09) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**85.8**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
OCTF-3-1.0 (P4B0015-10) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**79.3**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-6-0.5 (P4B0015-11) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**88.2**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-6-1.0 (P4B0015-12) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**72.7**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-7-0.5 (P4B0015-13) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**79.1**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-7-1.0 (P4B0015-14) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**79.0**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-8-0.5 (P4B0015-15) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**95.5**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-8-1.0 (P4B0015-16) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**95.8**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-9-0.5 (P4B0015-17) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**94.7**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	
OCTF-9-1.0 (P4B0015-18) Soil					Sampled: 01/30/04	Received: 01/30/04			
% Solids	**83.9**	1.00	% by Weight	1	NCA SOP	02/05/04	02/06/04	4020206	

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020042 - EPA 5035										
Blank (4020042-BLK1)				Prepared: 02/02/04 Analyzed: 02/09/04						
Acetone	ND	2500	ug/kg							
Benzene	ND	100	"							
Bromobenzene	ND	100	"							
Bromochloromethane	ND	100	"							
Bromodichloromethane	ND	100	"							
Bromoform	ND	100	"							
Bromomethane	ND	500	"							
2-Butanone	ND	1000	"							
n-Butylbenzene	ND	500	"							
sec-Butylbenzene	ND	100	"							
tert-Butylbenzene	ND	100	"							
Carbon disulfide	ND	1000	"							
Carbon tetrachloride	ND	100	"							
Chlorobenzene	ND	100	"							
Chloroethane	ND	100	"							
Chloroform	ND	100	"							
Chloromethane	ND	500	"							
2-Chlorotoluene	ND	100	"							
4-Chlorotoluene	ND	100	"							
1,2-Dibromo-3-chloropropane	ND	500	"							
Dibromochloromethane	ND	100	"							
1,2-Dibromoethane	ND	100	"							
Dibromomethane	ND	100	"							
1,2-Dichlorobenzene	ND	100	"							
1,3-Dichlorobenzene	ND	100	"							
1,4-Dichlorobenzene	ND	100	"							
Dichlorodifluoromethane	ND	500	"							
1,1-Dichloroethane	ND	100	"							
1,2-Dichloroethane	ND	100	"							
1,1-Dichloroethene	ND	100	"							
cis-1,2-Dichloroethene	ND	100	"							
trans-1,2-Dichloroethene	ND	100	"							
1,2-Dichloropropane	ND	100	"							
1,3-Dichloropropane	ND	100	"							
2,2-Dichloropropane	ND	100	"							
1,1-Dichloropropene	ND	100	"							

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509.924.9200 fax 509.924.9290
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503.906.9200 fax 503.906.9210
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541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020042 - EPA 5035										
Blank (4020042-BLK1)				Prepared: 02/02/04 Analyzed: 02/09/04						
cis-1,3-Dichloropropene	ND	100	ug/kg							
trans-1,3-Dichloropropene	ND	100	"							
Ethylbenzene	ND	100	"							
Hexachlorobutadiene	ND	200	"							
2-Hexanone	ND	1000	"							
Isopropylbenzene	ND	200	"							
p-Isopropyltoluene	ND	200	"							
4-Methyl-2-pentanone	ND	500	"							
Methyl tert-butyl ether	ND	100	"							
Methylene chloride	ND	500	"							
Naphthalene	ND	200	"							
n-Propylbenzene	ND	100	"							
Styrene	ND	100	"							
1,1,1,2-Tetrachloroethane	ND	100	"							
1,1,2,2-Tetrachloroethane	ND	100	"							
Tetrachloroethene	ND	100	"							
Toluene	ND	100	"							
1,2,3-Trichlorobenzene	ND	100	"							
1,2,4-Trichlorobenzene	ND	100	"							
1,1,1-Trichloroethane	ND	100	"							
1,1,2-Trichloroethane	ND	100	"							
Trichloroethene	ND	100	"							
Trichlorofluoromethane	ND	100	"							
1,2,3-Trichloropropane	ND	100	"							
1,2,4-Trimethylbenzene	ND	100	"							
1,3,5-Trimethylbenzene	ND	100	"							
Vinyl chloride	ND	100	"							
o-Xylene	ND	100	"							
m,p-Xylene	ND	200	"							
Surr: 4-BFB	*1880*		"	*2000*		*94.0*	*42.6-130*			
Surr: 1,2-DCA-d4	*2220*		"	*2000*		*111*	*57.3-144*			
Surr: Dibromofluoromethane	*2110*		"	*2000*		*106*	*45.5-130*			
Surr: Toluene-d8	*2120*		"	*2000*		*106*	*42.1-144*			

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020042 - EPA 5035										
LCS (4020042-BS1)				Prepared: 02/02/04	Analyzed: 02/09/04					
Benzene	2060	100	ug/kg	2000		103	81.9-125			
Chlorobenzene	2150	100	"	2000		108	79.2-125			
1,1-Dichloroethene	2070	100	"	2000		104	66.1-125			
Toluene	2140	100	"	2000		107	80-125			
Trichloroethene	2070	100	"	2000		104	76-125			
Surr: 4-BFB	*2000*		"	*2000*		*100*	*42.6-130*			
Surr: 1,2-DCA-d4	*2270*		"	*2000*		*114*	*57.3-144*			
Surr: Dibromofluoromethane	*2260*		"	*2000*		*113*	*45.5-130*			
Surr: Toluene-d8	*2280*		"	*2000*		*114*	*42.1-144*			
Matrix Spike (4020042-MS1)		**Source: P4B0015-01**		Prepared: 02/02/04	Analyzed: 02/09/04					
Benzene	2200	100	ug/kg dry	2090	ND	105	68.5-125			
Chlorobenzene	2240	100	"	2090	ND	107	65.9-125			
1,1-Dichloroethene	2260	100	"	2090	ND	108	55.8-125			
Toluene	2250	100	"	2090	ND	108	70.3-125			
Trichloroethene	2160	100	"	2090	ND	103	65.5-125			
Surr: 4-BFB	*1980*		"	*2090*		*94.7*	*42.6-130*			
Surr: 1,2-DCA-d4	*2280*		"	*2090*		*109*	*57.3-144*			
Surr: Dibromofluoromethane	*2170*		"	*2090*		*104*	*45.5-130*			
Surr: Toluene-d8	*2150*		"	*2090*		*103*	*42.1-144*			
Matrix Spike Dup (4020042-MSD1)		**Source: P4B0015-01**		Prepared: 02/02/04	Analyzed: 02/09/04					
Benzene	2350	100	ug/kg dry	2090	ND	112	68.5-125	6.59	25	
Chlorobenzene	2490	100	"	2090	ND	119	65.9-125	10.6	25	
1,1-Dichloroethene	2400	100	"	2090	ND	115	55.8-125	6.01	25	
Toluene	2450	100	"	2090	ND	117	70.3-125	8.51	25	
Trichloroethene	2350	100	"	2090	ND	112	65.5-125	8.43	25	
Surr: 4-BFB	*2080*		"	*2090*		*99.5*	*42.6-130*			
Surr: 1,2-DCA-d4	*2340*		"	*2090*		*112*	*57.3-144*			
Surr: Dibromofluoromethane	*2280*		"	*2090*		*109*	*45.5-130*			
Surr: Toluene-d8	*2280*		"	*2090*		*109*	*42.1-144*			

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Percent Dry Weight (Solids) per Standard Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020206 - Dry Weight										
Duplicate (4020206-DUP1)		**Source: P4B0008-06**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	79.6	1.00% by Weight			79.7			0.126	20	
Duplicate (4020206-DUP2)		**Source: P4B0015-04**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	75.1	1.00% by Weight			75.4			0.399	20	
Duplicate (4020206-DUP3)		**Source: P4B0029-02**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	93.8	1.00% by Weight			93.8			0.00	20	
Duplicate (4020206-DUP4)		**Source: P4B0108-01**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	96.5	1.00% by Weight			96.2			0.311	20	
Duplicate (4020206-DUP5)		**Source: P4B0109-02**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	93.3	1.00% by Weight			93.3			0.00	20	
Duplicate (4020206-DUP6)		**Source: P4B0109-03**		Prepared: 02/05/04 Analyzed: 02/06/04						
% Solids	94.0	1.00% by Weight			93.7			0.320	20	

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5559.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/11/04 13:46

Notes and Definitions

R-09	Analyte detected below MRL in sample extract. Percent solids calculation raised result above MRL. Result reported as Estimated Value.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

ERM-West, Inc. Portland Office
6650 SW Redwood Lane, Suite 300
Portland, Oregon 97224
T: 503-542-8007
F: 503-542-8017
www.erm.com

Appendix J
Transformer Pad Sampling Report

Environmental
Resources
Management

915 118th Avenue S.E.
Suite 130
Bellevue, WA 98005
(425) 462-8591
(425) 455-3573 (fax)

13 April 2004

Mr. Larry Patterson, P.E.
Environmental Manager
ATOFINA Chemicals, Inc.
6400 N.W. Front Avenue
Portland, Oregon 97210

Subject: Sampling Summary Report
Former Transformer Pads
ATOFINA Chemicals, Inc., Portland Facility

Dear Larry:

This summary report presents the results of concrete sampling and analysis for polychlorinated biphenyls (PCBs) at the ATOFINA Chemicals, Inc., (ATOFINA Chemicals) facility in Portland, Oregon (Figure 1). The purpose of this sampling was to evaluate the presence of PCBs in concrete storage pad areas where PCB-containing transformers were operated and stored (Figure 1). This data will supplement existing remedial investigation and feasibility study data, and previously collected PCB data. The sample collection was performed in accordance with the ERM-West, Inc. report titled *Sampling and Analysis Plan- PCBs in Concrete* (SAP), dated 16 October 2002.

BACKGROUND

The ATOFINA Chemicals facility is located at 6400 N.W. Front Avenue in the northwest industrial area of Portland, Oregon. The plant operated as a chemical manufacturing facility for over 50 years until 2001. The plant is no longer in operation and is currently being decommissioned.

Electrical transformers were historically installed at various locations throughout the ATOFINA Chemicals plant (Figure 2). In a letter dated 5 June 2002, ATOFINA Chemicals submitted to the Oregon Department of Environmental Quality (ODEQ), a map and spreadsheet which presented the location of transformers and PCB data. The data included the oldest available and most recent transformer oil test results.

One of the oldest identified former transformer storage pads was located west of the Maintenance Shop. This former transformer storage pad was sampled on 7 November 2002 for PCBs. The results of this investigation were presented in a letter to the ODEQ, dated 12 May 2003. During the investigation, PCBs were detected in eight of 15 surface chip samples collected. The PCB detections ranged from 0.138 to 1.360 milligrams per kilogram (mg/kg). Six of the eight samples revealing detections of PCBs were collected directly adjacent to the transformer support rails. The remaining two samples with detections were in areas of the pad where transformers are not known to have been stored.

According to 40 Code of Federal Regulations, Part 761, a "PCB-contaminated" material is a non-liquid with PCB concentrations greater than or equal to 50 parts per million (ppm). During investigation of the maintenance shop transformer pad, the greatest concentration of PCBs detected in any one sample was 1.360 ppm. Based on these sampling results, the concrete pad is not considered PCB-contaminated, and therefore, does not require regulation as a PCB-contaminated material.

ODEQ has requested additional sampling of concrete from transformer storage pads throughout the site to verify that none of the historic pads have been impacted by PCBs.

OBJECTIVES

The previous investigation indicated that the oldest and most heavily used former transformer storage pad was not significantly impacted by PCBs and can be disposed of off-site as a non-TSCA regulated waste. The purpose of this investigation was to determine if any of the other former transformer storage areas have been impacted by PCBs and may require further investigation. Future site demolition and potential development activities at the ATOFINA Chemicals facility will likely require dismantling and appropriate handling or disposal of the concrete within the pads. The objectives of this investigation were to:

- Determine if PCBs are present in the concrete as a result of historical leakage; and

- Determine the appropriate handling and disposal methods for the concrete.

SCOPE OF WORK

This investigation included the collection and analysis of concrete chip samples from each of the concrete pads not previously sampled where PCB-containing transformers are known or suspected to have been located (Figure 2). Each of the concrete storage areas were sampled in as many as five locations. Both discreet and composite samples were prepared and submitted for laboratory analysis. The composite concrete surface chip samples were analyzed for PCBs using United States Environmental Protection Agency Method SW-846 8082 by North Creek Analytical in Beaverton, Oregon, an Oregon-certified laboratory. The discreet sample for each sample location was submitted for laboratory archival. In the instance where PCBs were detected within a composite sample, the associated discreet samples were analyzed for PCBs to delineate the exact location of impacted concrete.

Samples were collected in accordance with *Standard Operating Procedure for Sampling Concrete in the Field*[1] and the SAP. A 1-inch diameter carbide drill bit was placed in a rotary impact hammer drill to generate a fine concrete powder suitable for analysis. The samples were collected to a depth of approximately 0.5 inch below the concrete surface. Approximately 50 grams of powdered material was collected and placed in a laboratory-supplied, unpreserved sample container (4-ounce glass jar) using a stainless steel scoopula.

A quantity of each of the samples collected from the storage pads were combined into a composite sample. A total of six composite samples were prepared. The composite samples were prepared by mixing with a stainless steel scoopula approximately equal quantities of sample material from each of the discreet samples.

The decontamination of all sampling equipment and the handling of all investigation-derived wastes were performed in accordance with the

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[1] United States Environmental Protection Agency. 1997. *Standard Operating Procedure for Sampling Concrete in the Field.* Office of Environmental Measurement and Evaluation. December 1997.

SAP. Decontamination of sampling equipment was performed prior to collecting samples from each location. No significant quantity of water was generated as a result of decontamination. Samples were delivered to the laboratory in sealed containers and accompanied by the Chain-of-Custody Record.

Sampling locations were selected based on the results of transformer dielectric fluid sampling conducted by ATOFINA Chemicals to identify which of their transformers contained PCBs. These results are included as Attachment A. Specific areas within concrete pads where transformers were historically mounted were identified in the field by ATOFINA Chemicals plant personnel.

RESULTS

PCBs were detected above laboratory reporting limits in two of the six composite samples. Arochlor® 1260 was detected in sample Pad B-Comp at 0.231 mg/kg and Arochlor® 1254 was detected in sample Comp D at 0.203 mg/kg. The discreet samples associated with those two composite samples were then released for PCB analysis. Three of the eight discreet samples analyzed for PCBs had detections of Arochlor® 1254 and/or 1260. The total PCB detections in the discreet samples ranged from 0.100 to 2.165 mg/kg.

Composite sample Comp E had high reporting limits (<13.4 mg/kg) for Arochlor® 1254 as a result of matrix interference experienced during analysis. Associated discreet sample 16T was analyzed to determine if any PCBs were present in this sample that may have been masked by the matrix interference. Sample 16T had no detections of PCBs. Associated discreet sample 52 was not analyzed because this pad will remain in service. Analytical results are summarized in Table 1. A site map showing the former transformer storage pad locations is provided as Figure 2. Analytical laboratory reports are included in Attachment B.

No staining or other evidence of oil release was observed at any of the concrete pads sampled. Neither of the plant personnel interviewed regarding the former transformer storage areas had any memory of release at the pads.

CONCLUSIONS

According to 40 Code of Federal Regulations, Part 761, a "PCB-contaminated" material is a non-liquid with PCB concentrations greater than or equal to 50 ppm. During this investigation, the greatest concentration of PCBs detected in any one sample was 2.165 ppm, or mg/kg. Based on these sampling results, the concrete pads are not considered PCB-contaminated, and therefore, do not require regulation as a PCB-contaminated material under the Toxic Substance Control Act.

ERM-West, Inc. appreciates the opportunity to provide environmental consulting services to ATOFINA Chemicals. If you have questions or require additional information, please call either of the undersigned at (425) 462-8591.

Sincerely,

Brian D. Magee
Staff Scientist

Erik C. Ipsen, P.E.
Project Manager

BDM/ECI/dwb/5560.00
Attachments

cc: Mr. Doug Loutzenhiser/ATOFINA Chemicals, Inc.

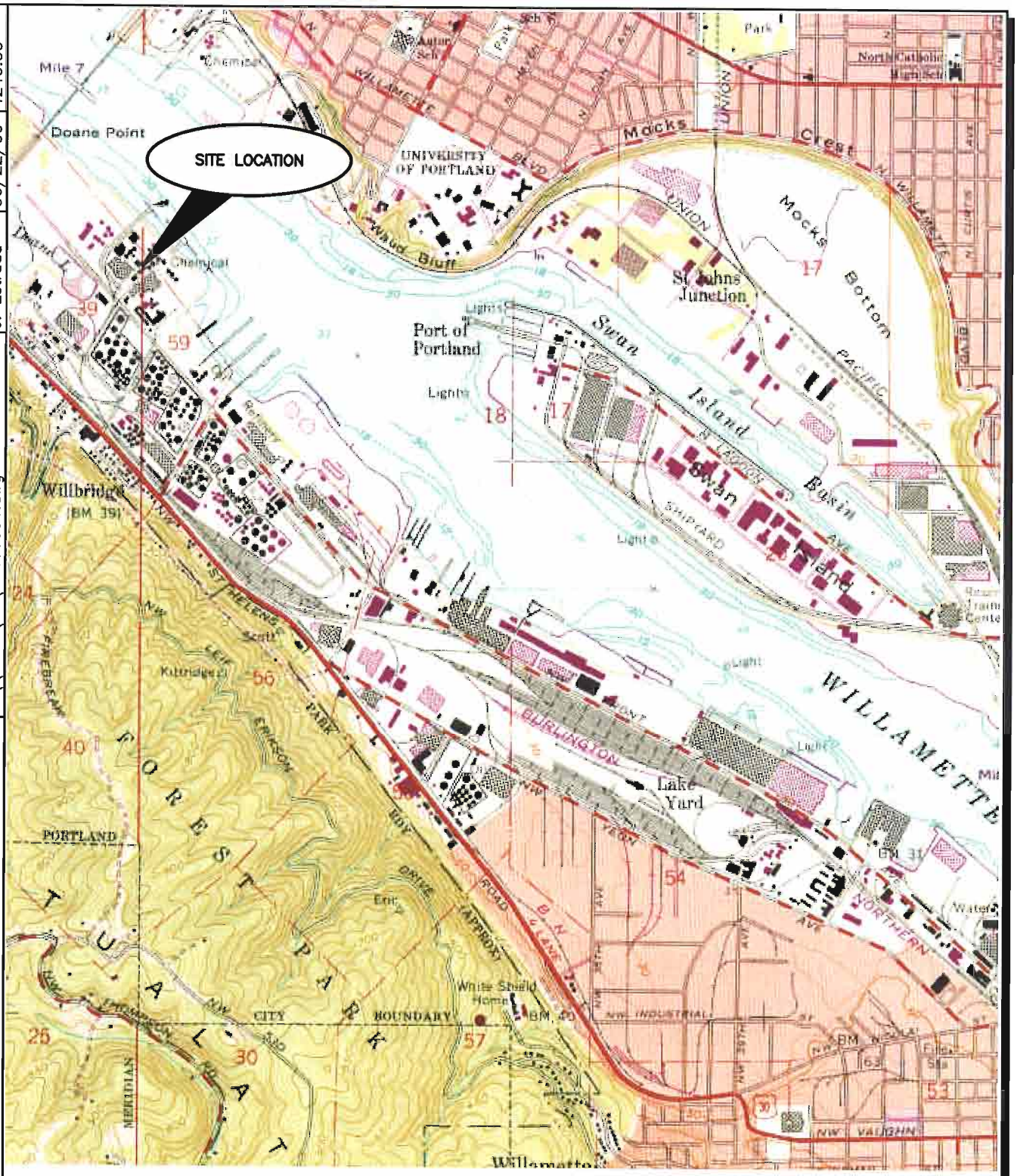
Figures

Project No. 4246.00

Date: 06/22/00

Drawn By: J. Estrada

CAD File: G:\4246\00\42460001.dwg



SCALE 1:24,000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

N

References:
U.S.G.S. 7.5 Minute Series (Topographic Portland, Oregon–Washington)
Dated: 1961; Photorevised 1970 and 1977

Figure 1
Site Location Map
ATOFINA Chemicals, Inc.
Portland, Oregon

ERM 06/00

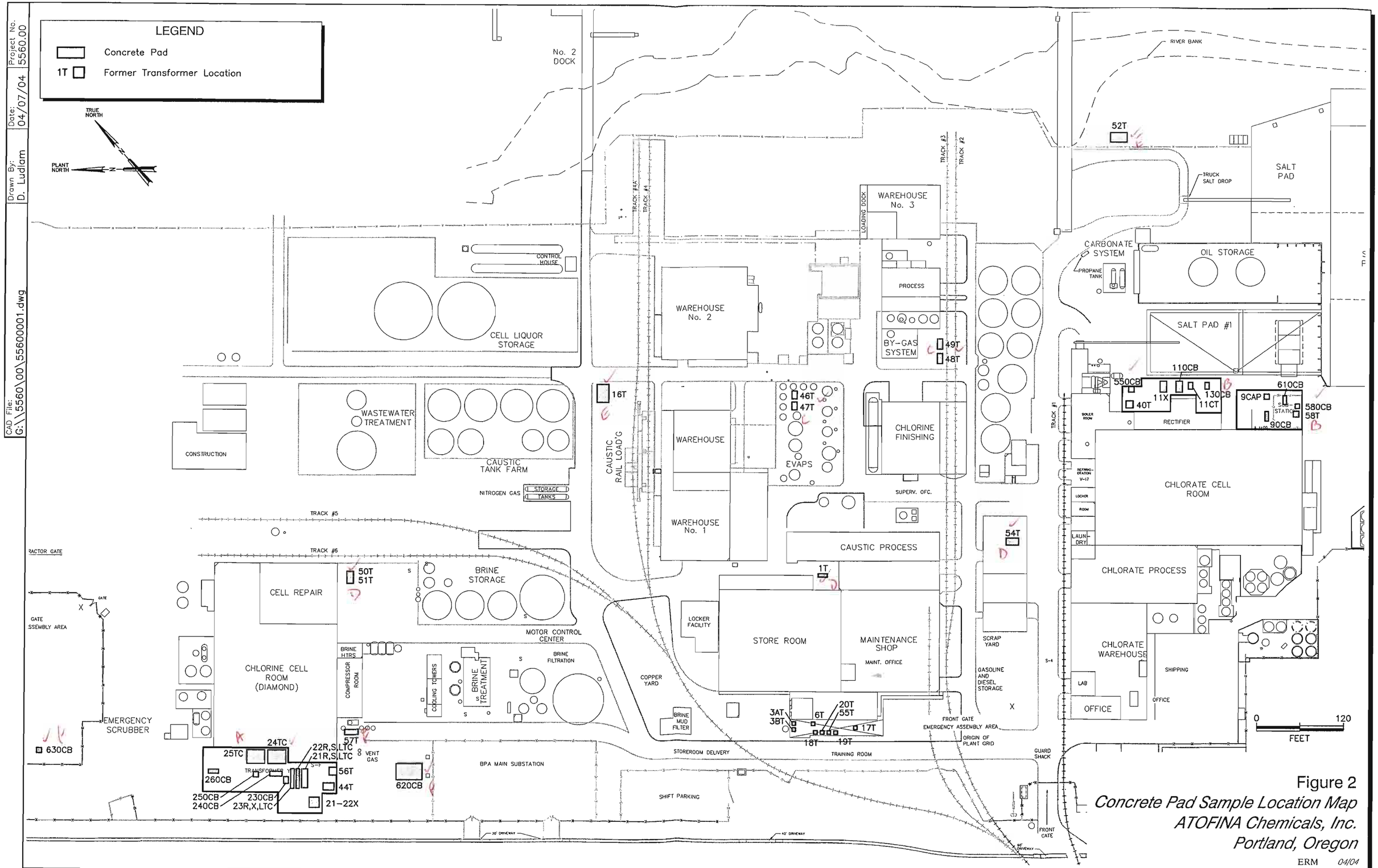


Figure 2
Concrete Pad Sample Location Map
ATOFINA Chemicals, Inc.
Portland, Oregon
ERM 04/04

Table

Table 1
Polychlorinated Biphenyl Detections in Concrete Samples
ATOFINA Chemicals, Inc
Portland, Oregon

Sample	Sample Type	Composited Samples	Date	Time	Arochlor 1254 *mg/kg*	Arochlor 1260 *mg/kg*
Pad A-Comp	Composite	21S, 22S, 23 OCB, 24TC, 26 OCB	1/29/2004	11:30	<0.0946	<0.094.6
Pad B-Comp	Composite	9 OCB, 13 OCB, 40T, 55 OCB, 58 OCB	1/29/2004	14:20	<0.0670	**0.231**
9 OCB	Discreet	NA	1/29/2004	14:10	<0.0670	<0.0670
13 OCB	Discreet	NA	1/29/2004	14:00	<0.0670	**0.100**
40T	Discreet	NA	1/29/2004	13:30	<0.0670	<0.0670
55 OCB	Discreet	NA	1/29/2004	13:40	<0.0670	**1.85**
58 OCB	Discreet	NA	1/29/2004	13:50	<0.0670	<0.0670
Comp C	Composite	46T/47T, 48, 49	1/30/2004	9:00	<0.0670	<0.067.0
Comp D	Composite	1T, 50/51T, 54T	1/30/2004	12:50	**0.203**	<0.067.0
1T	Discreet	NA	1/30/2004	9:15	**1.42**	**0.745**
50/51T	Discreet	NA	1/30/2004	10:30	<0.0670	<0.0670
54T	Discreet	NA	1/30/2004	8:30	<0.0670	<0.0670
Comp E	Composite	16T, 52	1/30/2004	13:00	<13.400	<0.067.0
16T	Discreet	NA	1/30/2004	10:00	<1.340	<1.340
Comp F	Composite	57T, 62 OCB, 63 OCB	1/30/2004	12:45	<0.134	<0.134

NA = Not Applicable
mg/kg = Milligrams per kilogram

Attachment A
Historical Transformer Oil Sampling Results

OIL-FILLED TRANSFORMER LISTING

ATOFINA Chemicals, Inc.

Equip. No.	Serial No.	Equip. Status	Equipment Location	Equipment Function (last location)	XFMR Fluid (gal)	Most Recent Data		Oldest Data on Record	
						PCB (ppm)	Test Date (M/D/Y)	PCB (ppm)	Test Date (M/D/Y)
1T	F957729	In Service	Alley Behind Storeroom & Shop	B-Set/Storeroom	215	6.6	11/19/90	6.6	11/19/90
2T	8111527	Disposed	DISPOSED 05/23/89		346	-	-	-	-
3AT	66G15079-W	Disposed	DISPOSED 09/11/01	Spare (W of Storeroom & Shop)	37.6	2.0	06/28/93	26.0	09/15/92
3BT	66G3296-C	Disposed	DISPOSED 09/11/02	Spare (W of Storeroom & Shop)	37.6	2.0	06/28/93	23.0	09/15/92
3CT	66G15078-E	Disposed	DISPOSED 03/12/96	(N of Chlorate; Pole Mount)	37.6	2.0	06/28/93	32.0	09/15/92
4AT	782017445-W	In Service	W of Construction / Contract Offices	Pole mount; Contract Welders	?	ND	04/28/97	ND	03/08/91
4BT	782017447-C	Disposed	DISPOSED 02/10/99	(W of Construction / Contract Offices, Pole mount)	?	ND	04/28/97	ND	03/08/91
4CT	782017449-E	In Service	W of Construction / Contract Offices	Pole mount; Contract Welders	?	ND	04/28/97	ND	03/08/91
5XT	6906887	Disposed	DISPOSED 08/26/93		510	87.0	06/28/93	98.0	11/21/90
6T	C861396	Disposed	DISPOSED 09/11/02	Spare 750 KVA XFMR 11500/480 (W of Storeroom & Shop)	340	24.0	11/21/90	24.0	11/21/90
7T	8111526	Disposed	DISPOSED 05/23/89		431	-	-	-	-
8T	N239947TKUA	Disposed	DISPOSED 04/05/01	Plant Air (NW Motor Truck Scale)	100	<1.0	11/19/90	<1.0	11/19/90
9R	AB69109T1	In Service	E of Chlorate Cell Room	Chlorate Bay B&C	?	ND	06/28/93	ND	06/28/93
9OCBA	265841A	Disposed	DISPOSED 01/25/02	Serves 9R (E of Chlorate Cell Room)	74	ND	06/04/01	ND	06/04/01
9OCBB	265841B	Disposed	DISPOSED 01/25/03	Serves 9R (E of Chlorate Cell Room)	74	ND	06/04/01	ND	06/04/01
9OCBC	265841C	Disposed	DISPOSED 01/25/04	Serves 9R (E of Chlorate Cell Room)	74	ND	06/04/01	ND	06/04/01
9CAP	136Y3266	In Service	E of Chlorate Cell Room	Cap bank in Chlorate XFMR Yard	?	ND	06/28/93	ND	06/28/93
10T	5393235	Disposed	DISPOSED 02/1983		290	-	-	-	-
11R	ZAS79451	Not Oper	E of Chlorate Cell Room	Chlorate D&E	5595	ND	03/09/00	7.8	11/21/90
11X	51971	Disposed	DISPOSED 01/25/02	Auto XFMR (E of Chlorate Cell Room)	?	ND	06/28/93	ND	06/28/93
11OCB	4153781101	Out of Serv	Oil Drained 05/21/02	Serves 11R	74	ND	03/06/87	ND	03/06/87
11T-P	1103310	Out of Serv	Oil Drained 05/21/02	Pole mount; Station service for XFMRs	19	<1.0	04/02/99	<1.0	04/02/99
11T-Q	1103309	Out of Serv	Oil Drained 05/21/02	Pole mount; Station service for XFMRs	19	<1.0	04/02/99	<1.0	04/02/99
11T-S	1103311	Out of Serv	Oil Drained 05/21/02	Pole mount; Station service for XFMRs	19	ND	04/02/99	<1.0	04/02/99
11AT		Disposed	DISPOSED 05/1999	Pole mount; Station service for XFMRs (E of Chlorate Cell Room)	?	ND	04/28/95	ND	04/28/95
11BT		Disposed	DISPOSED 05/1999	Pole mount; Station service for XFMRs (E of Chlorate Cell Room)	?	ND	04/28/95	ND	04/28/95
11CT		Disposed	DISPOSED 05/1999	Pole mount; Station service for XFMRs (E of Chlorate Cell Room)	?	ND	04/28/95	ND	04/28/95
12S	B501904	Disposed	DISPOSED 08/25/93		885	<1.0	11/21/90	<1.0	11/21/90
12X	B682310	Disposed	DISPOSED 08/25/93		1260	10.0	04/03/92	131.0	08/24/81
12R	7083355	Disposed	DISPOSED 10/03/88		4080	43.0	03/06/87	43.0	03/06/87
12TC	B501904LTC	Disposed	DISPOSED 08/25/93		165	7.0	04/03/92	7.0	04/03/92
13SA	D320924	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	605	111.0	11/20/90	40.0	08/24/81
13RA	6538964	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	1422	68.0	11/19/90	31.0	08/24/81
S13B	D320925	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	605	<1.0	11/20/90	32.0	08/24/81
R13B	6538966	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	1422	1.0	03/11/92	8.0	08/24/81
13OCB	S036Y1480	Disposed	DISPOSED 01/25/02	Serves 13 A&B (E of Chlorate Cell Room)	45	<1.0	11/20/90	31.0	08/24/81
15S	6995003	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	2882	10.0	11/21/90	3.0	08/24/81

Equip. No.	Serial No.	Equip. Status	Equipment Location	Equipment Function (last location)	XFMR Fluid (gal)	Most Recent Data		Oldest Data on Record	
						PCB (ppm)	Test Date (M/D/Y)	PCB (ppm)	Test Date (M/D/Y)
15R	6994991	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	2437	27.0	11/21/90	7.0	08/24/81
15TC	6995003LTC	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	157	<1.0	11/19/90	<1.0	11/19/90
16T	B364866	In Service	NE of Track 4A	Orthosil/CL2 stor. Tks MCC/WHouse #2	485	4.0	03/17/95	99.0	06/12/87
17T	B863845	Disposed	DISPOSED 09/11/01	Spare (W of Storeroom & Shop)	485	5.3	06/04/01	40.0	08/24/81
18T	6934427	Disposed	DISPOSED 09/11/01	Spare (W of Storeroom & Shop)	404	3.0	04/03/92	ND	06/18/82
19T	G855845	Disposed	DISPOSED 09/11/01	Spare (W of Storeroom & Shop)	215	9.6	11/21/90	9.6	11/21/90
20T	7375551	Disposed	DISPOSED 09/11/01	Spare (W of Storeroom & Shop)	445	2.0	11/21/90	2.0	11/21/90
21S	C0134451	Out of Serv	Oil Drained 01/02/02	Regulating XFMR (W of Chlorine Cell Room)	820	2.2	11/19/90	ND	08/24/81
21R	9622	In Service	W of Chlorine Cell Room	Rectifier XFMR	2800	<1.0	11/23/99	ND	08/24/81
21LTC	C0134451LTC	Out of Serv	Oil Drained 01/02/02	21S load tap Changer (W of Chlorine Cell Room)	95	<1 0	11/19/90	<1.0	11/19/90
22S	C0270451	Out of Serv	Oil Drained 01/02/02	Regulating XFMR (W of Chlorine Cell Room)	795	3.0	06/28/93	19.0	08/24/81
22R	14188	Out of Serv	Oil Drained 04/25/02	Rectifier XFMR	2800	ND	03/09/00	ND	08/04/80
22LTC	C0270451LTC	Out of Serv	Oil Drained 01/02/02	22S load tap Changer (W of Chlorine Cell Room)	95	<1.0	11/19/90	<1.0	11/19/90
21-22X	L481299	Out of Serv	Oil Drained 05/21/02	Auto XFMR	925	<1.0	11/19/90	<1.0	11/19/90
23R	H409842	Out of Serv	Oil Drained 05/24/02	Combined Rect. & Reg.	9000	<1 0	11/19/90	ND	08/24/81
23TC	H409842LTC	Out of Serv	Oil Drained 04/25/02	23R load tap Changer	500	<1.0	11/19/90	ND	08/24/81
23X	L481300	Out of Serv	Oil Drained 05/21/02	Auto XFMR	825	<1.0	11/21/90	<1.0	11/21/90
23OCB	0442A5409101	Out of Serv	Oil Drained 05/21/02	Serves 23R	70	<1.0	11/19/90	<1.0	11/19/90
24R	AC69290T1	Out of Serv	Oil Drained 04/25/02	Rectifier XFMR	7470	2.0	11/19/90	1.0	08/24/81
24TC	AC69290T1LTC	In Service	W of Chlorine Cell Room	24R load tap Changer: Compartment	?	2.0	11/19/90	2.0	11/19/90
24OCB	?	Disposed	DISPOSED 1991		70	<1.0	11/19/90	<1.0	11/19/90
24OCBA	285454A	Out of Serv	Oil Drained 05/21/02	Serves 24R	73	ND	06/28/93	<1.0	11/19/90
24OCBB	285454B	Out of Serv	Oil Drained 05/21/02	Serves 24R	73	ND	06/28/93	<1.0	11/19/90
24OCBC	285454C	Out of Serv	Oil Drained 05/21/02	Serves 24R	73	ND	03/17/95	<1.0	11/19/90
25R	AZ69172T1	Out of Serv	Oil Drained 04/30/02	Rectifier XFMR	6340	<1.0	11/19/90	ND	08/24/81
25TC	AZ69172T1LTC	In Service	W of Chlorine Cell Room	25R LTC (Diverter Switch?)	18.5	<1.0	11/19/90	<1.0	11/19/90
25OCB	41107581011	Out of Serv	Oil Drained 05/21/02	Serves 25R	90	ND	06/28/93	<1.0	11/19/90
26R	AN69106T1	In Service	W of Chlorine Cell Room	Rectifier XFMR Bays	6340	<1.0	11/20/90	<1.0	11/20/90
26OCBA	237Y6390A	In Service	W of Chlorine Cell Room	Serves 26R	55	<1.0	11/19/90	<1.0	11/19/90
26OCBB	237Y6390B	In Service	W of Chlorine Cell Room	Serves 26R	55	<1.0	05/11/90	<1.0	05/11/90
26OCBC	237Y6390C	In Service	W of Chlorine Cell Room	Serves 26R	55	<1.0	11/19/90	<1.0	11/19/90
39T	4036011	In Service	DOCK #2	[Air Cooled]; Cast coil	NA	NA	NA	ND	NA
40T	C863005	Disposed	DISPOSED 01/25/02	Chlorate (Boilers - Chlorate Rectifier)	350	3.0	07/23/99	17.0	08/24/81
41T	2598802	Disposed	DISPOSED 05/1991		405	16.0	06/24/81	16.0	06/24/81
42T	C861416	Disposed	DISPOSED 4/22/88		335	ND	08/24/81	ND	08/24/81
43T	59SG175	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	39	<1.0	03/11/92	<1.0	03/11/92
44T	5S3168	In Service	W of CL2 Cell Room; Inside 21-22 ACB	Control XFMR	22	ND	03/17/95	ND	03/17/95
45T	3010239	Disposed	DISPOSED 02/1983		30	-	-	-	-

OIL-FILLED TRANSFORMER LISTING

Equip. No.	Serial No.	Equip. Status	Equipment Location	Equipment Function (last location)	XFMR Fluid (gal)	Most Recent Data		Oldest Data on Record	
						PCB (ppm)	Test Date (M/D/Y)	PCB (ppm)	Test Date (M/D/Y)
46T	PDT03580101	Disposed	DISPOSED 01/25/02	Caustic Evaps E-SET (Inside E-Set Caustic Evap. Unit)	231	<1.0	11/19/90	30.0	08/24/81
47T	PDT03580102	Out of Serv	Oil Drained 05/24/02	Caustic Evaps E-SET (Inside E-Set Caustic Evap. Unit)	231	<1.0	11/19/90	ND	08/24/81
48T	SBV87040101	Disposed	DISPOSED 01/25/02	CL2 Finishing Motor Power (E of CL2 Finishing, Near Bygas Tank)	200	<1.0	11/20/90	ND	03/06/87
49T	89V5701	Disposed	DISPOSED 01/25/02	York CL2 Comp (E of CL2 Finishing, Near Bygas Tank)	620	<1.0	11/20/90	<1.0	11/20/90
50T	SBV87030101	Disposed	DISPOSED 01/25/02	Elliott CL2 Comp (S of Cell Repair)	165	<1.0	11/20/90	ND	06/18/82
51T	L243735	In Service	S of Cell Repair	Chlorine Cell Repair	192	<1.0	11/21/90	ND	08/24/81
52AT	909913	Disposed	DISPOSED 01/25/02	Dock 1 River Cooling Water (S Track 1 / Along Fence at Shore: South)	52	5.0	06/12/95	5.0	06/12/95
52BT	909911	Disposed	DISPOSED 01/25/02	Dock 1 River Cooling Water (S Track 1 / Along Fence at Shore: Center)	52	7.0	06/12/95	7.0	06/12/95
52CT	909912	Disposed	DISPOSED 01/25/02	Dock 1 River Cooling Water (S Track 1 / Along Fence at Shore: North)	52	7.0	06/12/95	7.0	06/12/95
54T	89V5698	In Service	W of Operations Office	Chlorate Process	420	<1.0	11/21/90	<1.0	11/21/90
55T	89V5697	Disposed	DISPOSED 01/25/02	Spare (W of Storeroom & Shop)	420	<1.0	11/21/90	<1.0	11/21/90
550CB	N75H114ESC	Disposed	DISPOSED 01/25/02	Serves 55T (E of Chlorate Cell Room)	50	1.7	11/19/90	1.7	11/19/90
56T	89V5699	Disposed	DISPOSED 01/25/02	Motor Power CL2 Plant (W of Chlorine Cell Room)	420	<1.0	11/19/90	<1.0	11/19/90
57T	89V5700	Disposed	DISPOSED 01/25/02	Motor Power CL2 Plant/Brine (S of Compressor Room)	629	<1.0	11/20/90	<1.0	11/20/90
58T	09L80A1002C	Disposed	DISPOSED 01/25/02	Cooling tower, CLO3 Process (E of Chlorate Cell Room)	766	<1.0	11/21/90	<1.0	11/21/90
580CB	75C128ESC	Disposed	DISPOSED 01/25/02	Serves 58T (E of Chlorate Cell Room)	50	1.2	11/19/90	1.2	11/19/90
610CBA	6351004CA1A	Disposed	DISPOSED 01/25/02	Serves 15R (E of Chlorate Cell Room)	49	3.9	11/19/90	3.9	11/19/90
610CBB	6351004CA1B	Disposed	DISPOSED 01/25/02	Serves 15R (E of Chlorate Cell Room)	49	<1.0	11/21/90	<1.0	11/21/90
610CBC	6351004CA1C	Disposed	DISPOSED 01/25/02	Serves 15R (E of Chlorate Cell Room)	49	<1.0	11/19/90	<1.0	11/19/90
620CBA	318523A	Out of Serv	Oil Drained	Serves 9 Rect (Temp Feed 4 S BPA Substation)	73	2.0	06/04/01	2.9	04/16/91
620CBB	318523B	Out of Serv	Oil Drained	Serves 9 Rect (Temp. Feed 4 S. BPA Substation)	73	2.4	06/04/01	<2.0	04/16/91
620CBC	318523C	Out of Serv	Oil Drained	Serves 9 Rect (Temp Feed 4 S. BPA Substation)	73	3.4	06/04/01	2.3	04/16/91
630CB	0442A6737110	Out of Serv	Oil Drained	N CAP Bank (S. Of BPA Substation Annex)	70	5.7	11/21/90	5.7	11/21/90
Q01S	C658763	Disposed	DISPOSED 08/26/93		605	13.0	04/03/92	16.0	09/24/86
Q01LTC	C658763LTC	Disposed	DISPOSED 08/26/93		180	11.0	04/03/92	127.0	09/24/86
Q02R	C658764	Disposed	DISPOSED 08/25/93		3000	2.0	04/03/92	56.0	06/18/82
Q03S	B314398	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	1635	<1.0	03/11/92	<1.0	11/20/90
Q03LTC	B314398LTC	Disposed	DISPOSED 10/21/94	(E of Chlorate Cell Room)	165	<1.0	03/11/92	135.0	09/24/86
Q04R	B314399	Disposed	DISPOSED 08/25/93		2725	3.0	04/03/92	29.0	06/18/82

Equip. No.	Serial No.	Equip. Status	Equipment Location	Equipment Function (last location)	XFMR Fluid (gal)	Most Recent Data		Oldest Data on Record	
						PCB (ppm)	Test Date (M/D/Y)	PCB (ppm)	Test Date (M/D/Y)
Q05	6906865	Disposed	DISPOSED 08/05/93		510	5.0	06/28/93	16.0	06/18/82
Q06	F962331	Disposed	DISPOSED 1986		195	602.0	09/24/86	602.0	09/24/86
	73991S	Disposed	DISPOSED 08/25/93		100	2.0	06/28/93	2.0	06/28/93
	73991T	Disposed	DISPOSED 08/25/93		100	1.0	06/28/93	1.0	06/28/93
	4010062	Disposed	DISPOSED	Warehouse 2/Rexselen Rect.	1.5	309.0	06/08/89	309.0	06/08/89
	4010061	Disposed	DISPOSED	Warehouse 2/Rexselen Rect.	1.5	301.0	06/08/89	301.0	06/08/89

Attachment B
North Creek Analytical
Laboratory Reports

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

24 February, 2004

Brian Magee
ERM (Bellevue)
915 118th Ave. SE, Suite 130
Bellevue, WA 98005

RE: Atofina

Enclosed are the results of analyses for samples received by the laboratory on 01/30/04 17:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa Domenighini
Project Manager

Work Orders included in this report:
P4B0011

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ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	02/24/04 13:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
PADA-COMP	P4B0011-01	Other dry	01/29/04 11:30	01/30/04 17:15
40T	P4B0011-09	Other dry	01/29/04 13:30	01/30/04 17:15
550CB	P4B0011-10	Other dry	01/29/04 13:40	01/30/04 17:15
580CB	P4B0011-11	Other dry	01/29/04 13:50	01/30/04 17:15
130CB	P4B0011-12	Other dry	01/29/04 14:00	01/30/04 17:15
90CB	P4B0011-13	Other dry	01/29/04 14:10	01/30/04 17:15
PADB-COMP	P4B0011-14	Other dry	01/29/04 14:20	01/30/04 17:15
54T	P4B0011-18	Other dry	01/30/04 08:30	01/30/04 17:15
COMP-C	P4B0011-19	Other dry	01/30/04 09:00	01/30/04 17:15
1T	P4B0011-20	Other dry	01/30/04 09:15	01/30/04 17:15
COMP-F	P4B0011-21	Other dry	01/30/04 12:45	01/30/04 17:15
50/51T	P4B0011-24	Other dry	01/30/04 10:30	01/30/04 17:15
COMP-D	P4B0011-25	Other dry	01/30/04 12:50	01/30/04 17:15
COMP-E	P4B0011-26	Other dry	01/30/04 13:00	01/30/04 17:15

North Creek Analytical - Portland

Lisa Domenighini

Lisa Domenighini, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PADA-COMP (P4B0011-01) Other dry					Sampled: 01/29/04	Received: 01/30/04			**R-01**
Aroclor 1016	ND	94.6	ug/kg wet	1	EPA 8082	02/04/04	02/10/04	4020128	
Aroclor 1221	ND	189	"	"	"	"	"	"	
Aroclor 1232	ND	94.6	"	"	"	"	"	"	
Aroclor 1242	ND	94.6	"	"	"	"	"	"	
Aroclor 1248	ND	94.6	"	"	"	"	"	"	
Aroclor 1254	ND	94.6	"	"	"	"	"	"	
Aroclor 1260	ND	94.6	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*59.9 %*	*36-140*							
Surr: Decachlorobiphenyl	*94.1 %*	*16-149*							
40T (P4B0011-09) Other dry					Sampled: 01/29/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/17/04	02/19/04	4020632	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*65.0 %*	*36-140*							
Surr: Decachlorobiphenyl	*98.6 %*	*16-149*							
550CB (P4B0011-10) Other dry					Sampled: 01/29/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	670	ug/kg wet	10	EPA 8082	02/17/04	02/21/04	4020632	R-05
Aroclor 1221	ND	1340	"	"	"	"	"	"	R-05
Aroclor 1232	ND	670	"	"	"	"	"	"	R-05
Aroclor 1242	ND	670	"	"	"	"	"	"	R-05
Aroclor 1248	ND	670	"	"	"	"	"	"	R-05
Aroclor 1254	ND	670	"	"	"	"	"	"	R-05
Aroclor 1260	**1850**	670	"	"	"	"	"	"	R-05
Surr: 2,4,5,6-Tetrachloro-m-xylene	*53.8 %*	*36-140*							*S-13*
Surr: Decachlorobiphenyl	*84.4 %*	*16-149*							*S-13*

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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503.906.9200 fax 503.906.9210
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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5560.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
580CB (P4B0011-11) Other dry					Sampled: 01/29/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/17/04	02/19/04	4020632	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*68.2 %*	*36-140*							
Surr: Decachlorobiphenyl	*92.8 %*	*16-149*							
130CB (P4B0011-12) Other dry					Sampled: 01/29/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/17/04	02/20/04	4020632	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	**100**	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*74.5 %*	*36-140*							
Surr: Decachlorobiphenyl	*112 %*	*16-149*							
90CB (P4B0011-13) Other dry					Sampled: 01/29/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/17/04	02/19/04	4020632	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*66.7 %*	*36-140*							
Surr: Decachlorobiphenyl	*102 %*	*16-149*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PADB-COMP (P4B0011-14) Other dry					Sampled: 01/29/04	Received: 01/30/04			
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/04/04	02/10/04	4020128	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	**231**	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*60.7 %*	*36-140*							
Surr: Decachlorobiphenyl	*90.4 %*	*16-149*							
54T (P4B0011-18) Other dry					Sampled: 01/30/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/17/04	02/19/04	4020632	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*69.1 %*	*36-140*							
Surr: Decachlorobiphenyl	*103 %*	*16-149*							
COMP-C (P4B0011-19) Other dry					Sampled: 01/30/04	Received: 01/30/04			
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/04/04	02/05/04	4020128	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*94.3 %*	*36-140*							
Surr: Decachlorobiphenyl	*87.1 %*	*16-149*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
1T (P4B0011-20) Other dry					Sampled: 01/30/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	670	ug/kg wet	10	EPA 8082	02/17/04	02/19/04	4020632	R-05
Aroclor 1221	ND	1340	"	"	"	"	"	"	R-05
Aroclor 1232	ND	670	"	"	"	"	"	"	R-05
Aroclor 1242	ND	670	"	"	"	"	"	"	R-05
Aroclor 1248	ND	670	"	"	"	"	"	"	R-05
Aroclor 1254	**1420**	670	"	"	"	"	"	"	R-05
Aroclor 1260	**745**	670	"	"	"	"	"	"	R-05
Surr: 2,4,5,6-Tetrachloro-m-xylene	*62.5 %*	*36-140*							*J*
Surr: Decachlorobiphenyl	*89.5 %*	*16-149*							*J*
COMP-F (P4B0011-21) Other dry					Sampled: 01/30/04	Received: 01/30/04			**R-01**
Aroclor 1016	ND	134	ug/kg wet	1	EPA 8082	02/04/04	02/10/04	4020128	
Aroclor 1221	ND	268	"	"	"	"	"	"	
Aroclor 1232	ND	134	"	"	"	"	"	"	
Aroclor 1242	ND	134	"	"	"	"	"	"	
Aroclor 1248	ND	134	"	"	"	"	"	"	
Aroclor 1254	ND	134	"	"	"	"	"	"	
Aroclor 1260	ND	134	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*84.3 %*	*36-140*							
Surr: Decachlorobiphenyl	*90.0 %*	*16-149*							
50/51T (P4B0011-24) Other dry					Sampled: 01/30/04	Received: 01/30/04			**O-07**
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/17/04	02/19/04	4020632	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*68.5 %*	*36-140*							
Surr: Decachlorobiphenyl	*103 %*	*16-149*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5560.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
COMP-D (P4B0011-25) Other dry					Sampled: 01/30/04	Received: 01/30/04			
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/04/04	02/10/04	4020128	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	**203**	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*67.6 %*	*36-140*							
Surr: Decachlorobiphenyl	*100 %*	*16-149*							
COMP-E (P4B0011-26) Other dry					Sampled: 01/30/04	Received: 01/30/04			
Aroclor 1016	ND	67.0	ug/kg wet	1	EPA 8082	02/04/04	02/10/04	4020128	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	1340	"	20	"	"	02/11/04	"	R-03
Aroclor 1254	ND	13400	"	"	"	"	"	"	R-03
Aroclor 1260	ND	67.0	"	1	"	"	02/10/04	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*82.3 %*	*36-140*							
Surr: Decachlorobiphenyl	*101 %*	*16-149*							

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082 - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020128 - EPA 3550										
Blank (4020128-BLK1)				Prepared & Analyzed: 02/04/04						
Aroclor 1016	ND	67.0	ug/kg							
Aroclor 1221	ND	134	"							
Aroclor 1232	ND	67.0	"							
Aroclor 1242	ND	67.0	"							
Aroclor 1248	ND	67.0	"							
Aroclor 1254	ND	67.0	"							
Aroclor 1260	ND	67.0	"							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*33.6*		"	*33.3*		*101*	*36-140*			
Surr: Decachlorobiphenyl	*34.1*		"	*33.3*		*102*	*16-149*			
LCS (4020128-BS1)				Prepared & Analyzed: 02/04/04						
Aroclor 1016	320	67.0	ug/kg	333		96.1	57-135			
Aroclor 1260	344	67.0	"	333		103	60-135			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*33.5*		"	*33.3*		*101*	*36-140*			
Surr: Decachlorobiphenyl	*35.5*		"	*33.3*		*107*	*16-149*			
Matrix Spike (4020128-MS1)		**Source: P4B0103-01**		Prepared & Analyzed: 02/04/04						**R-05**
Aroclor 1016	426	268	ug/kg dry	443	ND	96.2	37-145			
Aroclor 1260	389	268	"	443	ND	87.8	25-144			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*33.8*		"	*44.3*		*76.3*	*36-140*			
Surr: Decachlorobiphenyl	*46.1*		"	*44.3*		*104*	*16-149*			
Matrix Spike Dup (4020128-MSD1)		**Source: P4B0103-01**		Prepared & Analyzed: 02/04/04						**R-05**
Aroclor 1016	405	268	ug/kg dry	443	ND	91.4	37-145	5.05	26	
Aroclor 1260	373	268	"	443	ND	84.2	25-144	4.20	30	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*33.0*		"	*44.3*		*74.5*	*36-140*			
Surr: Decachlorobiphenyl	*44.9*		"	*44.3*		*101*	*16-149*			

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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5560.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082 - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020632 - EPA 3550										
Blank (4020632-BLK1)				Prepared: 02/17/04		Analyzed: 02/20/04				
Aroclor 1016	ND	67.0	ug/kg							
Aroclor 1221	ND	134	"							
Aroclor 1232	ND	67.0	"							
Aroclor 1242	ND	67.0	"							
Aroclor 1248	ND	67.0	"							
Aroclor 1254	ND	67.0	"							
Aroclor 1260	ND	67.0	"							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*31.3*		"	*33.3*		*94.0*	*36-140*			
Surr: Decachlorobiphenyl	*26.4*		"	*33.3*		*79.3*	*16-149*			
LCS (4020632-BS1)				Prepared: 02/17/04		Analyzed: 02/20/04				
Aroclor 1016	301	67.0	ug/kg	333		90.4	57-135			
Aroclor 1260	269	67.0	"	333		80.8	60-135			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*28.7*		"	*33.3*		*86.2*	*36-140*			
Surr: Decachlorobiphenyl	*26.7*		"	*33.3*		*80.2*	*16-149*			
LCS Dup (4020632-BSD1)				Prepared: 02/17/04		Analyzed: 02/20/04				
Aroclor 1016	342	67.0	ug/kg	333		103	57-135	12.8	25	
Aroclor 1260	315	67.0	"	333		94.6	60-135	15.8	27	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*32.2*		"	*33.3*		*96.7*	*36-140*			
Surr: Decachlorobiphenyl	*31.4*		"	*33.3*		*94.3*	*16-149*			
Matrix Spike (4020632-MS1)		**Source: P4B0474-05**		Prepared: 02/17/04		Analyzed: 02/20/04				**R-05**
Aroclor 1016	ND	670	ug/kg wet	333	ND	NR	37-145	NA		Q-08
Aroclor 1260	227	670	"	333	ND	68.2	25-144			J
Surr: 2,4,5,6-Tetrachloro-m-xylene	*23.8*		"	*33.3*		*71.5*	*36-140*			*J*
Surr: Decachlorobiphenyl	*25.2*		"	*33.3*		*75.7*	*16-149*			*J*

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	02/24/04 13:39

Polychlorinated Biphenyls per EPA Method 8082 - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4020632 - EPA 3550										
Matrix Spike Dup (4020632-MSD1)		**Source: P4B0474-05**		Prepared: 02/17/04 Analyzed: 02/20/04						**R-05**
Aroclor 1016	ND	670	ug/kg wet	333	ND	NR	37-145	NA	26	Q-08
Aroclor 1260	209	670	"	333	ND	62.8	25-144	8.26	30	J
Surr: 2,4,5,6-Tetrachloro-m-xylene	*20.9*		"	*33.3*		*62.8*	*36-140*			*J*
Surr: Decachlorobiphenyl	*22.1*		"	*33.3*		*66.4*	*16-149*			*J*

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ERM (Bellevue)	Project:	Atofina	
915 118th Ave. SE, Suite 130	Project Number:	5560.00	**Reported:**
Bellevue, WA 98005	Project Manager:	Brian Magee	02/24/04 13:39

Notes and Definitions

J	Estimated value.
O-07	This sample was extracted outside the EPA recommended holding time.
Q-08	Unable to quantitate spike recovery due to matrix interference and/or dilution necessary for analysis.
R-01	The reporting limit for this analyte was raised to compensate for the limited sample quantity available for the analysis.
R-03	The reporting limit for this analyte was raised due to matrix interference.
R-05	Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.
S-13	Surrogate recoveries reported from original, undiluted analysis; analyte(s) reported from analysis of sample dilution.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

PHBOC11

Environmental Resources Management

CHAIN OF CUSTODY RECORD

NO: 0351

915-118th Avenue S.E. Suite 130 ● Bellevue, WA 98005 ● (425) 462-8591 ● FAX (425) 455-3573

PROJECT #	PROJECT NAME
5560.00	Atofina Portland - Concrete Sampling

SAMPLER: (PRINT NAME)	(SIGNATURE)
Brian Magee	[signature]

RECEIVING LABORATORY: NCA - Beaverton, OR

SAMPLE I.D.	DATE	TIME	COMP	GRAB	SAMPLING METHOD	PRESERVATIVE	ICE (Y/N)	SAMPLING VOLUME	# OF CONTAINERS	MATRIX: SOIL	MATRIX: WATER	MATRIX: GAS	REQUESTED PARAMETERS: PCBs by 8082	REQUESTED PARAMETERS: Hold pending results
PADA-COMP	1-29	1130	X		Rotohammer	—	N		1				X	
21S	1-29	1100		X		—			1					X
22S	1-29	1105		X		—			1					X
230CB	1-29	1125		X		—			1					X
260CB	1-29	1115		X		—			1					X
24TC	1-29	1050		X		—			1					X
62	1-29	1200		X		—			1					X
57T	1-29	1210		X		—			1					X
40T	1-29	1330		X		—			1					X
550CB	1-29	1340		X		—			1					X

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
[signature]	1-30	1700	[signature]	1/30	1719
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME

FIELD REMARKS: 5.0 2.3

REMARKS ON SAMPLE RECEIPT

- ☐ BOTTLE INTACT
- ☐ CUSTODY SEALS
- ☐ CHILLED
- ☐ PRESERVED
- ☐ SEALS INTACT
- ☐ SEE REMARKS

ERM REMARKS:

SEND REPORT TO: Brian Magee

WHITE - LABORATORY COPY CANARY - FIELD COPY PINK - DATABASE MANAGER GOLD - PROJECT FILE

P4B0011

Environmental Resources Management

CHAIN OF CUSTODY RECORD

NO: 0202

915-118th Avenue S.E. Suite 130 ● Bellevue, WA 98005 ● (425) 462-8591 ● FAX (425) 455-3573

PROJECT #	PROJECT NAME
5560.00	Atofina Portland - Concrete Sampling

SAMPLER: (PRINT NAME)	(SIGNATURE)
Brian Magee	

RECEIVING LABORATORY: NCA - Beaverton, OR

SAMPLE I.D.	DATE	TIME	COMP	GRAB	SAMPLING METHOD	PRESERVATIVE	ICE (Y/N)	SAMPLING VOLUME	# OF CONTAINERS	MATRIX: SOIL	MATRIX: WATER	MATRIX: GAS	REQUESTED PARAMETERS: PCB's by 8082	REQUESTED PARAMETERS: Hold pending results
58 OCB	1-29	1350		X	Rotohammer	—	N	—	1					X
13 OCB	1-29	1400		X	↓	↓	↓	↓	↓					X
9 OCB	1-29	1410		X	↓	↓	↓	↓	↓					X
PADB comp	1-29	1420		X	↓	↓	↓	↓	↓				X	
52	1-29	1610		X	↓	↓	↓	↓	↓					X
48	1-29	1625		X	↓	↓	↓	↓	↓					X
49	1-29	1630		X	↓	↓	↓	↓	↓					X
54 T	1-30-04	830		X	↓	↓	↓	↓	↓					X
~~56T/57T~~	~~1/30/04~~	~~850~~		~~X~~	↓	↓	↓	↓	↓					~~X~~
Comp-C	1/30/04	900	X		↓	↓	↓	↓	↓				X	

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
	1-30	1730	Carl Talbis	1/30	1730
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME

FIELD REMARKS: 5.0 2.3

REMARKS ON SAMPLE RECEIPT:
- ☐ BOTTLE INTACT
- ☐ CUSTODY SEALS
- ☐ CHILLED
- ☐ PRESERVED
- ☐ SEALS INTACT
- ☐ SEE REMARKS

ERM REMARKS:

SEND REPORT TO:

WHITE - LABORATORY COPY CANARY - FIELD COPY PINK - DATABASE MANAGER GOLD - PROJECT FILE

H40011

Environmental Resources Management

CHAIN OF CUSTODY RECORD

NO: 0203

915-118th Avenue S.E. Suite 130 ● Bellevue, WA 98005 ● (425) 462-8591 ● FAX (425) 455-3573

PROJECT #	PROJECT NAME
5560.00	Atofina Portland - PCBs in Concrete

SAMPLER: (PRINT NAME)	(SIGNATURE)
Brian Magee	

RECEIVING LABORATORY: NCA - Beaverton, OR

SAMPLE I.D.	DATE	TIME	COMP.	GRAB	SAMPLING METHOD	PRESERVATIVE	ICE (Y/N)	SAMPLING VOLUME	# OF CONTAINERS	MATRIX: SOIL	MATRIX: WATER	MATRIX: GAS	REQUESTED PARAMETERS: PCBs by 8082	REQUESTED PARAMETERS: Hold
1T	1/30/04	915		X	Rock-Hammer	–	Y		1					X
Comp-E		1245	X										X	
63 OCB		1120		X										X
46T/47T		850		X										X
50/51 T		1030		X										X
Comp-D		1250	X										X	
Comp E		1300	X										X	
16T		1000												X

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
	1-30	1720	Cindy Jasin	1/30	1709
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME

FIELD REMARKS: 5.0 2.3

REMARKS ON SAMPLE RECEIPT

- ☐ BOTTLE INTACT
- ☐ CUSTODY SEALS
- ☐ CHILLED
- ☐ PRESERVED
- ☐ SEALS INTACT
- ☐ SEE REMARKS

ERM REMARKS:

SEND REPORT TO:

WHITE - LABORATORY COPY CANARY - FIELD COPY PINK - DATABASE MANAGER GOLD - PROJECT FILE

NORTH CREEK ANALYTICAL COOLER RECEIPT FORM

(Army Corp. compliant)

Client: ERM

1. **Please sign for receipt and opening of** 2 **cooler or** ____ **other** ____

   By (print) Callie Falkshoiz (sign) [signature]

2. Date samples received 7/30/04 Date opened: Same X or ___/___/___

3. Delivered by: ___NCA courier ___ FedEx ___UPS ___Courier ✓ Client ___Other ____

   Airbill # if applicable ____ (Put copy of shipping papers in file)

4. There were 0 custody seals present, signed by ____ date ___/___/___.

5. Were the custody seals unbroken and intact at the date and time of arrival? ___Yes ___No

6. Was ice used? X yes ___no Type of ice: ___ blue ice ___gel ice X real ice

   Temperature (degrees C) 5.0 23 Raytek thermometer ____ Digi-Therm (probe temperature blank)

7. Are custody papers sealed in a plastic bag and taped inside to lid? ___Yes X No

8. Were custody papers filled out properly (ink, signed, etc.)? X Yes ___No

   If "no" please specify: ____

9. Was project identifiable from custody papers? X Yes ___No

   Name of project Atofina Concrete Sampling (if applicable)

10. **Initial and date for unpacking:** KD **(initials)** **date** 2/2/04

11. Packing material: NA bubble wrap/bag ___styrofoam ___cardboard ____other

12. Were samples in bags? ___Yes X No

13. Did all containers indicated on the COC arrive? X Yes ___No

    If "no" please indicate which containers were absent ____

14. Were all containers unbroken and labels in good condition? X Yes ___No

    If "no" please indicate which containers ____

15. Were all bottle labels complete (ID, date, time, signature, etc.)? X Yes ___No

    Do the IDs, times, etc. agree with the COC? ___Yes X No

    If "no" please indicate which containers 260CB labeled 260CBA date/time matches

16. Are containers properly preserved for indicated analysis? X Yes ___No

17. Is there adequate volume for the test(s) requested? ___Yes ___No

    limited volume

18. If voa vials were submitted, are they free of bubbles? ___N/A ___Yes ___No

19. **Log-in phase: Date samples were logged in:** 2/2/04 **Elm Project #** P4B0011

20. Logged in by (print) Kim Davis (sign) [signature]

21. Was the project manager notified of status? (Use back of form as a record) ___Yes ✓ No

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425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

06 April 2004

Brian Magee
ERM (Bellevue)
915 118th Ave. SE, Suite 130
Bellevue, WA 98005
RE: Atofina

Enclosed are the results of analyses for samples received by the laboratory on 04/02/04 11:20. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Lisa Domenighini
Project Manager

www.ncalabs.com

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425.420.9200 fax 425.420.9210
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907.563.9200 fax 907.563.9210

ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	04/06/04 17:03

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
16T	P4D0066-01	Other dry	01/30/04 10:00	04/02/04 11:20

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

North Creek Analytical, Inc.
Environmental Laboratory Network

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
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907.563.9200 fax 907.563.9210

ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	04/06/04 17:03

Polychlorinated Biphenyls per EPA Method 8082
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
16T (P4D0066-01) Other dry	**Sampled: 01/30/04 10:00**		**Received: 04/02/04 11:20**							**O-07**
Aroclor 1016	ND	222	1340	ug/kg wet	20	4040139	04/05/04	04/06/04	EPA 8082	R-05, D, U
Aroclor 1221	ND	254	2680	"	"	"	"	"	"	R-05, D, U
Aroclor 1232	ND	222	1340	"	"	"	"	"	"	R-05, D, U
Aroclor 1242	ND	222	1340	"	"	"	"	"	"	R-05, D, U
Aroclor 1248	ND	77.4	1340	"	"	"	"	"	"	R-05, D, U
Aroclor 1254	ND	122	1340	"	"	"	"	"	"	R-05, D, U
Aroclor 1260	ND	230	1340	"	"	"	"	"	"	R-05, D, U
Surrogate: 2,4,5,6-Tetrachloro-m-x	*85.6 %*		*36-140*			"	"	"	"	*J, D*
Surrogate: Decachlorobiphenyl	*102 %*		*16-149*			"	"	"	"	*D*

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Project Manager

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
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907.563.9200 fax 907.563.9210

ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	04/06/04 17:03

Polychlorinated Biphenyls per EPA Method 8082 - Quality Control
North Creek Analytical - Portland

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4040139: Prepared 04/05/04 Using EPA 3550											
Blank (4040139-BLK1)											
Aroclor 1016	ND	11.1	67.0	ug/kg							U
Aroclor 1221	ND	12.7	134	"							U
Aroclor 1232	ND	11.1	67.0	"							U
Aroclor 1242	ND	11.1	67.0	"							U
Aroclor 1248	ND	3.87	67.0	"							U
Aroclor 1254	ND	6.10	67.0	"							U
Aroclor 1260	ND	11.5	67.0	"							U
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	*35.3*			"	*33.3*		*106*	*36-140*			
Surrogate: Decachlorobiphenyl	*36.3*			"	*33.3*		*109*	*16-149*			
LCS (4040139-BS1)											
Aroclor 1016	332	11.1	67.0	ug/kg	333		99.7	57-135			
Aroclor 1260	306	11.5	67.0	"	333		91.9	60-135			
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	*34.0*			"	*33.3*		*102*	*36-140*			
Surrogate: Decachlorobiphenyl	*36.0*			"	*33.3*		*108*	*16-149*			
Matrix Spike (4040139-MS1)						**Source: P4D0031-02**					
Aroclor 1016	292	22.2	134	ug/kg dry	389	ND	75.1	37-145			R-05, D
Aroclor 1260	197	23.0	134	"	389	ND	50.6	25-144			R-05, D
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	*30.2*			"	*38.9*		*77.6*	*36-140*			*D*
Surrogate: Decachlorobiphenyl	*13.3*			"	*38.9*		*34.2*	*16-149*			*D*
Matrix Spike Dup (4040139-MSD1)						**Source: P4D0031-02**					
Aroclor 1016	309	22.2	134	ug/kg dry	389	ND	79.4	37-145	5.66	26	R-05, D
Aroclor 1260	164	23.0	134	"	389	ND	42.2	25-144	18.3	30	R-05, D
Surrogate: 2,4,5,6-Tetrachloro-m-xylene	*29.3*			"	*38.9*		*75.3*	*36-140*			*D*
Surrogate: Decachlorobiphenyl	*10.0*			"	*38.9*		*25.7*	*16-149*			*D*

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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ERM (Bellevue)	Project: Atofina	
915 118th Ave. SE, Suite 130	Project Number: 5560.00	**Reported:**
Bellevue, WA 98005	Project Manager: Brian Magee	04/06/04 17:03

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Appendix K
Stormwater Characterization Report

Stormwater Characterization Report

Arkema Inc.
Portland Plant

May 18, 2005

ARKEMA Inc.
6400 NW Front Avenue
Portland, Oregon 97210

503-228-7655 Fax: 503-225-7279
www.arkemagroup.com

Table of Contents

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1.2 Recent Plant Activities
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Table 1 – Monthly Effluent Sampling Results

Attachments

Attachment 1 – Arkema Letter dated January 11, 2005
Attachment 2 – DEQ Letter dated March 3, 2004

1.0 Introduction

Arkema Inc., was issued a new NPDES stormwater discharge permit by the Oregon Department of Environmental Quality (DEQ) on January 22, 2004. The permit was issued for the discharge of storm runoff water from the plant site. A condition of the permit required Arkema to conduct Storm Water Characterization for Legacy and 303(d) constituents for a one-year period. A summary report is to be submitted to DEQ summarizing the monitoring.

1.1 Background

The Arkema facility is located at 6400 N.W. Front Avenue in the northwest industrial area of Portland, Oregon (Figure 1). The facility is bounded by Front Avenue on the north and west, the Willamette River on the east, and an asphalt-roofing manufacturer on the south. The plant operated as a chemical manufacturing facility for over 50 years until 2001. Between 1941 and 2001, various chemicals were produced including sodium chlorate, potassium chlorate, sodium and ammonium perchlorate, chlorine, sodium hydroxide, hydrogen, DDT, sodium orthosilicate, ammonia, and hydrochloric acid. Manufacturing activities at the facility were terminated in the spring of 2001 and most plant buildings and structures have been demolished.

The prior NPDES permit, issued on January 28, 1993, authorized the discharge of process wastewater, cooling water, and storm water runoff. Because the manufacturing operations were operational during this period, the permit authorized a discharge flow of up to 37.0 million gallons per day. Almost all of this flow was cooling water. Arkema notified the DEQ in March of 2001 that manufacturing operations were being suspended. In January of 2004, DEQ issued a new NPDES permit for the discharge of only storm water.

1.2 Recent Plant Activities

During 2003 and 2004, most of the plant buildings and structures were demolished on the plant site. Demolition was carried out in three phases. Phase I consisted of the removal of steel tanks, overhead steel structures and piping. This phase was completed during the spring of 2003. Phase II consisted of the removal of buildings and tanks in the northern half of Arkema's developed property. This phase was carried out during the later half of 2003. Phase II demolition did not involve any removal of concrete slabs or building foundations. Phase III demolition started in late March of 2004 and was completed in January 2005. Phase III demolition consisted of the removal of the buildings in the southern half of the property and incorporated the removal of the majority of the concrete slabs and building foundations. Concrete in the Acid Plant area and in the Chlorate area was left in place to serve as a temporary environmental cap in accordance with the Phase III Demolition Plan that was reviewed and approved by DEQ.

All plant demolition debris was also handled in accordance with the approved demolition plans. Those materials hauled off-site for disposal included:

a. All demolition debris from the Chlorate Plant area,
b. The No. 3 Warehouse,
c. The former process building and No. 2 Warehouse in the Acid Plant area, and
d. Certain concrete pads used as transformer foundations.

All other brick and concrete was crushed and used for compacted fill in the plant.

1.3 Storm Sewer System

Figure 2 shows the layout of the plant's existing storm sewer system. Many of these sewers have been in place for nearly 50 years and were designed to carry large volumes of cooling water. Many were also designed to drain building basements and process sumps, and therefore are rather deep.

Prior to demolition, all downspouts, floor drains and other drainage systems that could be impacted by the demolition activities were plugged with concrete. Some pipes on older drawings could not be located.

The plant's sewer system is separated into four smaller drainage systems. Each drainage system is connected to a separate large concrete Parshall flume located on the riverbank. The Parshall flumes and associated discharge pipes are numbered from south to north as Outfalls 001, 002, 003, and 004. The associated sewer systems have been referred to as the No. 1 sewer, No. 2 sewer, No. 3 sewer, and the No. 4 sewer systems. The Parshall flumes and associated discharge pipes for Outfalls 001, 002, and 003 are located between Arkema's southern-most dock (Salt Dock) and northern-most dock (No. 2 Dock). The Parshall flume and discharge pipe for Outfall 004 are located north of the No. 2 Dock.

The majority of the plant's storm drains were not disturbed by the demolition activities. During demolition, cloth filter inserts were installed in the storm drains throughout the plant. At the completion of demolition, the filter inserts were replaced with new filters.

2.0 Stormwater Characterization Study

Condition C.2 of the current NPDES waste discharge permit required Arkema to conduct monitoring for the following legacy and 303(d) constituents in the stormwater:

-Total Dissolved Solids
-Iron
-Manganese

-Mercury
-Hexavalent Chromium
-DDT, DDE, and DDD
-PAHs
-PCBs
-Chlorobenzene
-Pentachlorophenol
-Perchlorate
-Chloride

Monitoring was required for these constituents once per month at each outfall for a one-year period. Monitoring was required during those months when rainfall generated sufficient runoff to sample. The permit specified that results should be submitted quarterly to the DEQ Cleanup Project Manager as part of the Quarterly Progress Report for the facility remedial investigation and feasibility study. In addition, a report summarizing the one-year monitoring effort is to be submitted to DEQ within 14 months after permit issuance.

2.1 *Stormwater Sampling Frequency*

Since the current NPDES permit was issued in late January 2004, the first round of Stormwater Characterization samples were taken from all four outfalls on February 17, 2004. Because of a holding time issue at the laboratory, most of these samples were never analyzed. (See Arkema's letter to DEQ dated January 11, 2005 – Attachment 1). The first full round of Stormwater Characterization samples that were properly analyzed were for March of 2004. Stormwater samples were obtained during each subsequent month except for June and July of 2004. Sampling was not possible during these months due to dry weather conditions.

Arkema's letter to DEQ dated January 11, 2005 suggested a shift in the one-year sampling period to extend from March 2004 through February 2005. As pointed out in the letter, this would also shift the submittal date for the summary report to April 22, 2005. After discussing the letter with DEQ, it was agreed that the one-month shift in schedule was appropriate. Due to very dry conditions in February 2005, further discussions were held with DEQ. It was agreed that Arkema should obtain a final round of Stormwater Characterization samples in March 2005 to complete the study and also to obtain a post-demolition stormwater sample. The final round of sampling occurred on March 29, 2005.

2.2 *Stormwater Characterization Data Reports*

As required by the current NPDES permit, the data was submitted to DEQ as an attachment to the Quarterly Progress Reports. The data was provided in a spreadsheet format with all available data displayed by month of the year. The spreadsheet was divided into categories for:

-conventionals (total dissolved solids, chloride and perchlorate),
-metals (iron, manganese, mercury, and hexavalent chromium),
-volatile organics (chlorobenzene),
-semi-volatile organics (naphthalene, acenaphthylene, acenaphthene, fluorine, pentachlorophenol, phenanthrene, anthracene, fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,I)perylene)
-organochlorine pesticides (4,4'-DDT, 4,4'-DDE, and 4,4'-DDD)
-PCB's (Arochlors 1016, 1221, 1232, 1242,1248, 1254, and 1260)

Data spreadsheets were included in the Quarterly Progress Reports submitted to DEQ on July 8, 2004, October 7, 2004, and January 6, 2005. Although the last round of Stormwater Characterization data was not available to include in the April 7, 2005 Quarterly Report, the final round of data was submitted in a subsequent letter dated April 20, 2005.

The final Stormwater Characterization data spreadsheet is included as Table 1.

3.0 Stormwater Characterization Results

Stormwater Characterization samples were taken throughout the Phase III demolition period that extended over summer and winter conditions (March 2004-January 2005).

By letter dated March 3, 2004, DEQ informed Arkema;

> "for stormwater source control screening, DEQ is currently using five times the ambient water quality criteria (AWQC) or a DEQ Level II ecological risk assessment screening level value (SLV) if an AWQC is not available. This 5x standard is only for substances that do not bioaccumulate." (See DEQ's letter – Attachment 2).

Using this criteria, each constituent is discussed below.

Total Dissolved Solids

Outfalls 001 and 003 appear to have slight increases in TDS in the fall and early winter of 2004. This seems to correlate well with demolition activities and rainfall. TDS in these outfalls appears to decrease slightly based on sample results in 2005. Outfalls 002 and 004 show a definite decrease in TDS concentrations throughout the sampling program.

Although there is a guide concentration of 100.0 mg/L for TDS for the Willamette River, there are no actual acute or chronic water quality standards for TDS for the Willamette River. There appears to be a trend for decreasing concentrations in the runoff and with the small volume of runoff, TDS does not appear to be of concern.

Chloride

The existing acute and chronic water quality standards for the Willamette River for chloride are 860 and 230 mg/L, respectively. The acute water quality standard was never exceeded in any of the outfalls. None of the monthly samples for Outfalls 001, 002, or 003 approached the chronic water quality standard for chloride. The only period where runoff exceeded the chronic standard was in Outfall 004 during the start of demolition activities. Since the May 2004 sample, none of the samples from Outfall 004 have exceeded the chronic water quality standard. Chloride is not considered to be bioaccumulative and does not exceed DEQ's stormwater screening criteria. Chloride does not appear to be an issue in plant runoff.

Perchlorate

There are no acute or chronic water quality standards established for perchlorate for the Willamette River. By letter dated March 3, 2004 (copy attached as Attachment 2), DEQ notified Arkema that they had calculated an aquatic SLV for perchlorate of 200 ug/L. Using this number for comparative purposes, only runoff from Outfall 001 during demolition of the Chlorate area buildings exceeded 200 ug/l.. The highest concentration of perchlorate in Outfall 001 occurred in September 2004 (608 ppb). The runoff sample for March 2005 for Outfall 001 (84 ppb) decreased to well below the SLV number of 200 ug/L. None of the samples for Outfalls 002, 003, and 004 approached the 200 ug/L number. Perchlorate does not appear to be an issue in plant runoff.

Mercury

All sample results for mercury from all four outfalls were less than the detection limit with the exception of the May 2004 sample for Outfall 004 (0.2 ppb). That sample result was reported at the detection limit and all subsequent samples were less than the detection limit. Mercury does not appear to be an issue in plant runoff.

Hexavalent Chromium

The existing acute and chronic water quality standards for hexavalent chromium for the Willamette River are 16 and 11 ug/L, respectively. None of the samples from Outfalls 001, 002, and 003 exceed the detection limit of 10.0 ug/L, with two exceptions. The March 2005 sample result for Outfall 001 contained 10.1 ug/L,

only slightly above the detection limit. The January 2005 sample result for Outfall 003 contained 11.2 ug/L. However, the March 2005 sample for Outfall 003 did not exceed the detection limit.

Hexavalent chromium concentrations in Outfall 004 appear to show a slight increase that may be associated with demolition activities. The peak concentration occurred during December of 2004 at 26.4 ug/L. The January and March 2005 sample results dropped to 17.0 and 18.0 ug/L respectively which are only slightly above the water quality standards.

Hexavalent chromium is not considered to be bioacumulative and none of the sample results for Outfall 004 exceed DEQ's stormwater screening criteria. However, because it is not clearly understood why chromium was detected in Outfall 004, Arkema conducted an additional detailed sewer investigation that is described in Section 4.0.

Chlorobenzene

All chlorobenzene samples for all four outfalls were below the detection limit. Chlorobenzene is not an issue in plant runoff.

Semi-Volatile Organic Compounds

All semi-volatile organic compound analyte results were less than the detection level with one exception. The samples for Outfalls 001, 002, and 004 for October 2004 contained 130, 71, and 30 ug/L of pentachlorophenol, respectively. As part of the Phase III demolition project, pressure treated utility poles were cut flush to grade with chain saws and were then cut into short lengths so they could be removed from the plant. This activity occurred during the month of October. It is assumed that sawdust containing pentachlorophenol from the pressure treated wood caused the positive results in the October effluent samples. Subsequent samples for all outfalls for November 2004 through March 2005 had no detectable levels of any semi-volatile compounds. Pentachlorophenol is not an issue in plant runoff.

Organochlorine Pesticides

As required by the NPDES waste discharge permit, 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD were included in the pesticide analyte list. Generally the monthly results for all four outfalls were less than 1.0 ug/L, but DDT and DDE were consistently detected in every outfall. In order to collect further information regarding the DDT detections, Arkema determined that further investigation was warranted.

During the last monthly sampling event on March 29, 2005 additional samples were obtained at sixteen different locations within the four sewer systems. The results of this further investigation are described in Section 4.0.

Polychlorinated Biphenyls

All PCB arochlor analyte results were less than the detection level. PCBs are not an issue in plant stormwater runoff.

4.0 March 2005 Expanded Sewer Sampling

DDT compounds were detected in all four outfalls throughout the one-year Stormwater Characterization sampling program. In order to collect further information regarding the detection of DDT compounds, Arkema collected addition stormwater analytical data. During the March 2005 sampling event, the sampling effort was expanded to include several locations within each of the four sewer systems. Sample distribution was as follows:

-Five samples from the No. 1 sewer system plus the outfall sample,
-Three samples from the No. 2 sewer system plus the outfall sample,
-Four samples from the No. 3 sewer system plus the outfall sample, and
-Four samples from the No. 4 sewer system plus the outfall sample.

Figure 3 shows the location of each sewer sample. The sample results are also displayed on Figure 3. The range of DDT concentrations within each sewer system was:

-No. 1 sewer system (0.051 to 1.6D* ug/L)
-No. 2 sewer system (0.47D to 4.9D ug/L)
-No. 3 sewer system (0.089 to 0.25 ug/L)
-No. 4 sewer system (0.063 to 1.9D ug/L)

To confirm the results of this initial sampling, Arkema is proposing to conduct another round of stormwater sampling for these pesticide compounds . Upon receipt of the results from the second round of expanded sewer sampling, Arkema proposes to discuss the data with DEQ to determine an appropriate course of action.

Hexavalent chromium was detected in Outfall 004. The concentrations appear to have increased during the Phase III demolition project and peaked in December 2004 at 26.4 ug/L. Subsequent samples results from Outfall 004 in January and March 2005 decreased to 17.0 and 18.0 ug/L, respectively. Because the source of the chromium in Outfall 004 is not clearly understood, Arkema included hexavalent chromium in the expanded sewer sampling effort conducted on

* Diluted sample

March 29, 2005. Five hexavalent chromium samples were obtained from the No. 4 sewer system. Figure 3 shows the location of each sample within the No. 4 sewer system. The sample results are also displayed on Figure 3. Hexavalent chromium concentrations within the sewer ranged from 14.5 to 25.8 ug/L.

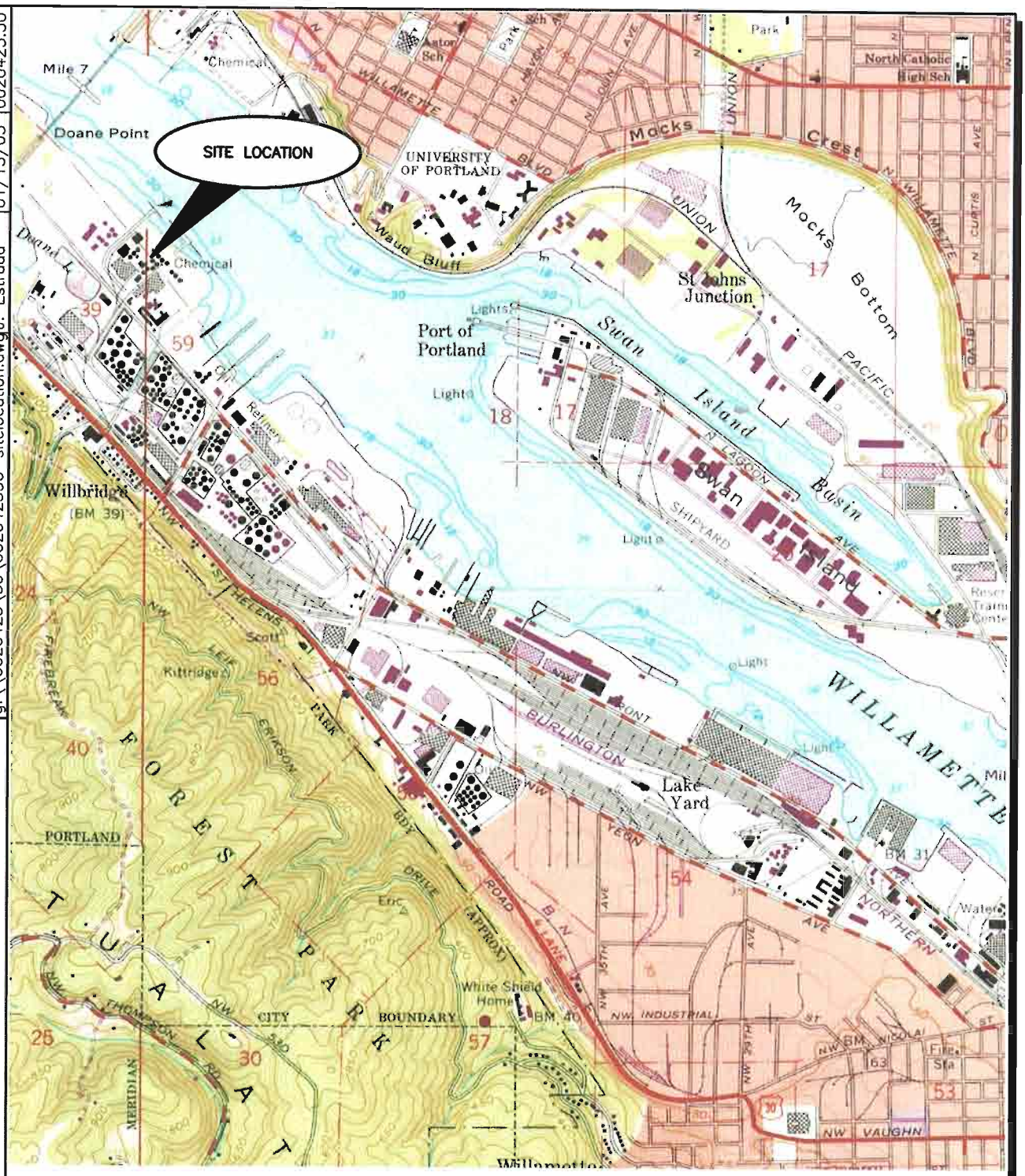
Although chromium concentrations have never exceeded DEQ's stormwater screening criteria, Arkema is proposing to repeat this sampling to confirm the initial round of sampling.

5.0 Summary

Based on the results of the one-year Stormwater Characterization study, DDT compounds are the only analytes in the plant stormwater runoff that appear to be of interest. The expanded sampling conducted in March of 2005 provided additional data from throughout the storm sewer system. In order to confirm the initial results, Arkema is proposing to conduct additional sampling for DDT compounds and hexavalent chromium in the plant storm water system.

Note that it is anticipated that the existing stormwater collection system may be extensively modified and/or replaced as part of the on-going Upland and In-water remediation activities currently underway.

Project No. 0020423.30
Date: 01/13/05
Drawn By: J. Estrada
CAD File: g:\0020423\30\002042330-sitelocation.dwg



SCALE 1:24,000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

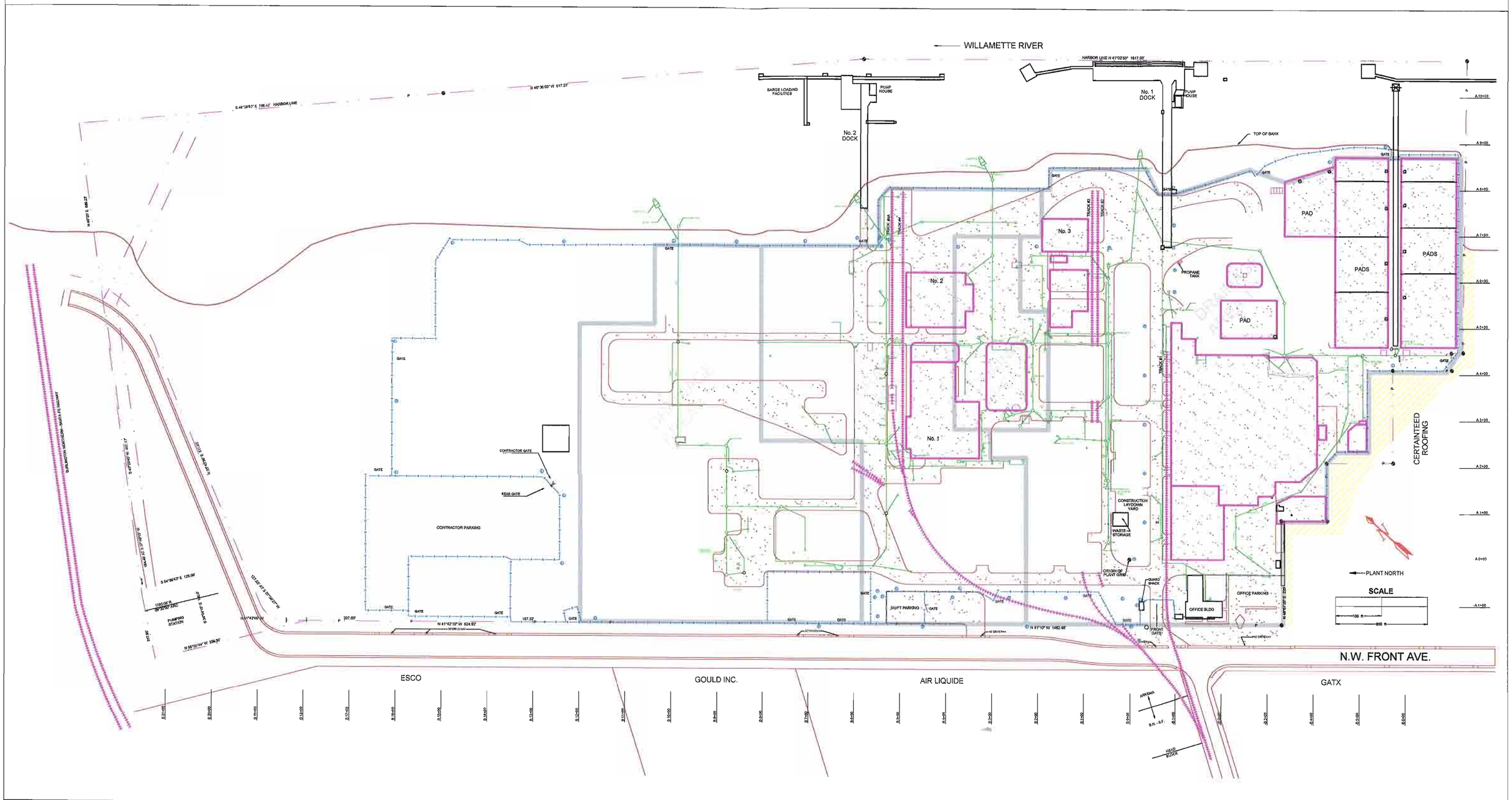
1 .5 0 1 KILOMETER

N

References:
U.S.G.S. 7.5 Minute Series (Topographic Portland, Oregon–Washington)
Dated: 1961; Photorevised 1970 and 1977

Figure 1
Site Location Map
Arkema, Inc.
Portland, Oregon

ERM *01/05*



STORMWATER LEGEND

#001-1 = Sample from No. 1 sewer at first location
DDT/DDE/DDD in ug/L
10.1 = Hexavalent chromium in ug/L
[1] = Field Duplicate
D = The reported result is from a Dilution
DRAINAGE AREA
Indust. Sewer, Drain, Manhole

LEGEND

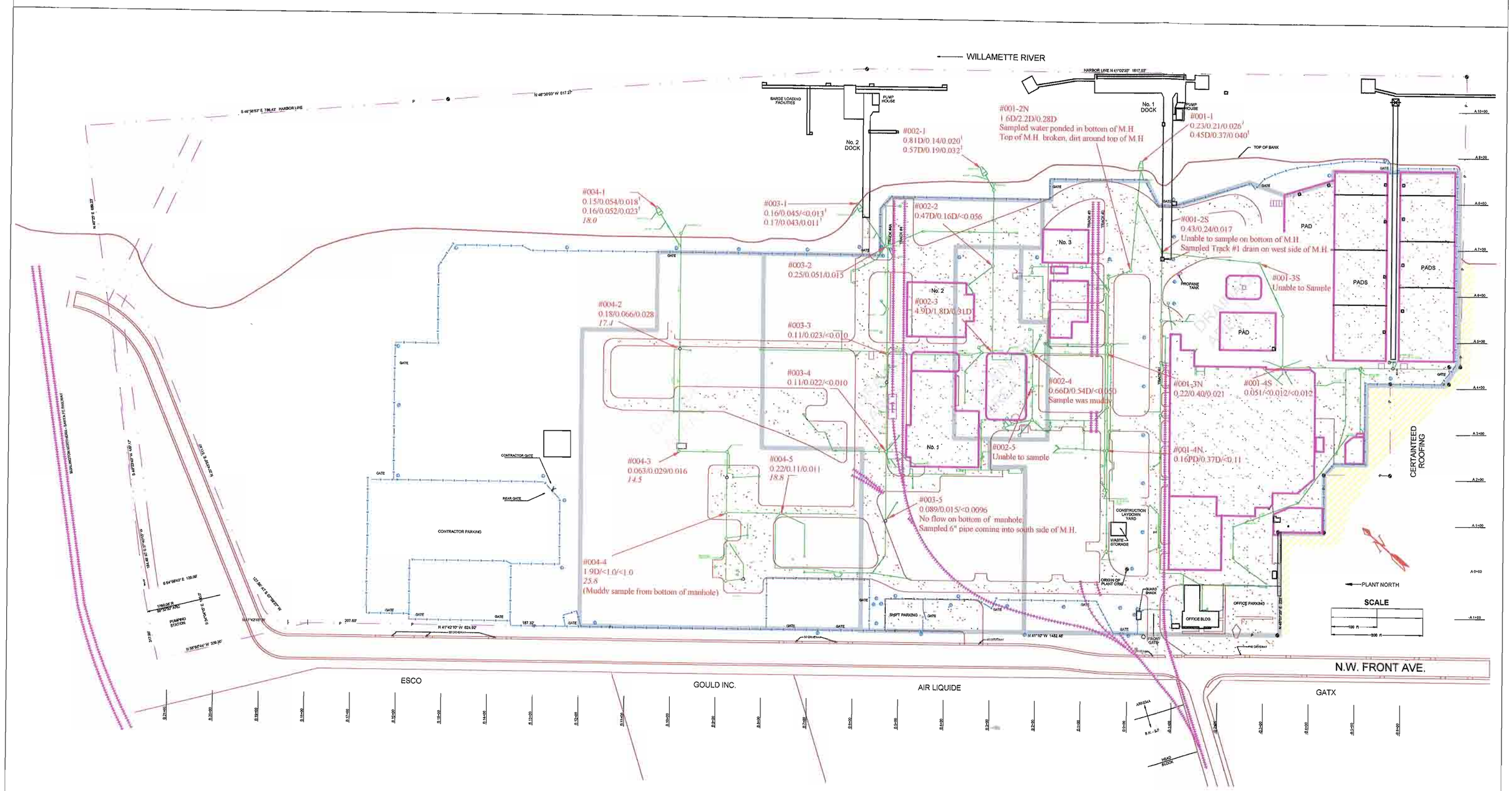
LEGAL BOUNDARY, EASEMENT
FOUNDATIONS, ASPHALT PADS, IMPERVOUS
STREETS, PARKING AREAS, IMPERVIOUS
RAILROAD
FENCE
LIGHT POLE, POWER POLE

ARKEMA

Arkema Inc, 6400 NW Front Ave, Portland, OR 97210

FIGURE 2

DRAWN BY: JMB DATE: 04/29/05 SCALE: 1" = 200'
DWG No. P - 003 - 00052 REV. 4 APPROVED



STORMWATER LEGEND

#001-1 = Sample from No. 1 sewer at first location
DDT/DDE/DDD in ug/L
10.1 = Hexavalent chromium in ug/L
[1] = Field Duplicate
D = The reported result is from a Dilution

Indust, Sewer, Drain, Manhole

LEGEND

LEGAL BOUNDARY, EASEMENT
FOUNDATIONS, ASPHALT PADS, IMPERVOUS
STREETS, PARKING AREAS, IMPERVIOUS
RAILROAD
FENCE
LIGHT POLE, POWER POLE

ARKEMA

Arkema Inc, 6400 NW Front Ave, Portland, OR 97210

FIGURE 3

DRAWN BY: JMB DATE: 04/29/05 SCALE: 1" = 200'
DWG No. P - 003 - 00052 REV. 3 APPROVED

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Portland, OR

Stormwater Characterization

2004/2005 Date	Total Dissolved Solids (ppm) OF #1	OF #2	OF #3	OF #4	Chloride (ppm) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	113	324	61	2050	33.3	16.8	2.3	9.72
April	120	71	43	975	31.1	4.2	3.4	354
May	162	114	68	768	45.6	7.3	3.7	241
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	170	124	180	280	38.6	7.5	20.6	58.1
September	208	110	135	440	55.4	6.7	5.3	131
October	308	69	356	206	93.0	2.6	47.7	37.2
November	280	106	137	524	62.9	6.1	6.5	144
December	113	42	160	408	21.7	2.5	14.7	69.1
January	158	29	111	298	37.9	0.7	6.6	58.9
February	C	C	C	C	C	C	C	C
March	204	63	107	280	19.4	3.2	7.1	43.9

2004/2005 Date	Perchlorate (ppm) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA
Febuary	A	A	A	A
March	0.0557	0.0051	0.0078	0.0061
April	0.0042	0.0101	0.0266	0.0056
May	0.0184	0.0083	0.0021	0.0099
June	C	C	C	C
July	C	C	C	C
August	0.222	0.0088	0.0179	0.0116
September	0.608	0.0042	0.002	0.0084
October	0.171	<0.002	0.0082	0.0407
November	0.314	0.0166	<0.002	0.038
December	0.280	0.0042	0.0042	0.038
January	0.212	0.0031	<0.002	0.0059
February	C	C	C	C
March	0.084	0.0109	<0.002	0.0029

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Stormwater Characterization

Metals

2004/2005 Date	Iron (ppm) OF #1	OF #2	OF #3	OF #4	Manganese (ppm) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	0.546	1.05	0.466	1.58	0.0161	0.0171	0.0093	0.0368
March	11.40	2.52	1.93	2.37	0.184	0.059	0.0735	0.0874
April	1.560	2.600	0.791	1.730	0.0456	0.0657	0.020	0.0438
May	0.935	2.440	0.609	7.300	0.0423	0.0479	0.0148	0.0989
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	0.644	1.360	2.430	2.222	0.0266	0.0435	0.0497	0.0422
September	1.400	1.500	2.050	5.950	0.0746	0.0881	0.0415	0.0976
October	7.310	2.620	5.940	8.230	0.140	0.0385	0.0728	0.128
November	2.990	2.370	1.390	4.860	0.0691	0.0483	0.0366	0.0776
December	1.690	0.810	2.270	4.910	0.0290	0.0141	0.0374	0.0821
January	4.530	1.890	2.450	3.840	0.0741	0.0338	0.0382	0.0633
February	C	C	C	C	C	C	C	C
March	1.680	0.960	1.180	1.670	0.0356	0.0205	0.0229	0.0324

2004/2005 Date	Mercury (ppb) OF #1	OF #2	OF #3	OF #4	Hex. Chromium (ppb) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<0.2	0.3	<0.2	<0.2	<10	<10	<10	<10
April	<0.2	<0.2	<0.2	<0.2	<10[B]	<10[B]	<10[B]	15.6[B]
May	<0.2	<0.2	<0.2	0.2	<10	<10	<10	10.2
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<0.2	<0.2	<0.2	<0.2	<10	<10	<10	15.4
September	<0.2	<0.2	<0.2	<0.2	<10	<10	<10	10.7
October	<0.2	<0.2	<0.2	<0.2	<10	<10	<10	18.7
November	<0.2	<0.2	<0.2	<0.2	<10	<10	<10	23.3
December	<0.2	<0.2	<0.2	<0.2	<10	<10	<10	26.4
January	<0.2	<0.2	<0.2	<0.2	<10	<10	11.2	17.0
February	C	C	C	C	C	C	C	C
March	<0.2	<0.2	<0.2	<0.2	10.1	<10	<10	18.0

Arkema Stormwater Characterization

Portland, OR

Volatile Organic Compounds

2004/2005 Date	Chlorobenzene (ppb) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA
Febuary	*A*	*A*	*A*	*A*
March	<5.0	<5.0	<5.0	<5.0
April	<5.0	<5.0	<5.0	<5.0
May	<5.0	<5.0	<5.0	<5.0
June	*C*	*C*	*C*	*C*
July	*C*	*C*	*C*	*C*
August	<5.0	<5.0	<5.0	<5.0
September	<5.0	<5.0	<5.0	<5.0
October	<5.0	<5.0	<5.0	<5.0
November	<5.0	<5.0	<5.0	<5.0
December	<5.0	<5.0	<5.0	<5.0
January	<5.0	<5.0	<5.0	<5.0
February	*C*	*C*	*C*	*C*
March	<5.0	<5.0	<5.0	<5.0

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Stormwater Characterization

Semi-Volatile Organic Compounds

2004/2005	Naphthalene (ppb)				Acenaphthylene (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<10	<9.8	<10	<9.7	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<10	<9.6	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10	<9.8	<9.8	<9.9	<10
October	<9.7	<9.6	<9.6	<9.7	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6

2004/2005	Acenaphthene (ppb)				Fluorene (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<10	<9.8	<9.6	<9.7	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10	<9.8	<9.8	<9.9	<10
October	<9.7	<9.7	<9.6	9.7	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6

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Stormwater Characterization

Semi- Volatile Organic Compounds

2004/2005 Date	Pentachlorophenol (ppb) OF #1	OF #2	OF #3	OF #4	Phenanthrene (ppb) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<25	<25	<24	<25	<10	<9.8	<9.6	<9.7
April	<24	<24	<24	<24	<9.6	<9.6	<9.6	<9.6
May	<25	<25	<25	<25	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<24	<24	<24	<24	<9.6	<9.6	<9.6	<9.6
September	<25	<25	<25	<25	<9.8	<9.8	<9.9	<10
October	130	<25	71	30	<9.7	<9.7	<9.6	9.7
November	<24	<24	<24	<25	<9.6	<9.6	<9.6	<9.7
December	<24	<24	<26	<36	<9.6	<9.6	<11	<15
January	<24	<25	<24	<26	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<24	<24	<24	<24	<9.5	<9.6	<9.5	<9.6

2004/2005 Date	Anthracene (ppb) OF #1	OF #2	OF #3	OF #4	Fluoranthene (ppb) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<10	<9.8	<9.6	<9.7	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10	<9.8	<9.8	<9.9	<10
October	<9.7	<9.7	<9.6	9.7	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6

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Stormwater Characterization

Semi-Volatile Organic Compounds

2004/2005	Pyrene (ppb)				Benz (a)anthracene (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<10	<9.8	<9.6	<9.7	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10	<9.8	<9.8	<9.9	<10
October	<9.7	<9.7	<9.6	9.7	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6

2004/2005	Chrysene (ppb)				Benzo(b) fluoranthene (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<10	<9.8	<9.6	<9.7	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10	<9.8	<9.8	<9.9	<10
October	<9.7	<9.7	<9.6	9.7	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6

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Stormwater Characterization

Semi-Volatile Organic Compounds

2004/2005	Benzo (k) Fluoranthene (ppb)				Benzo (a) pyrene (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<10	<9.8	<9.6	<9.7	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10	<9.8	<9.8	<9.9	<10
October	<9.7	<9.7	<9.6	9.7	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6

2004/2005	Indeno (1,2,3-cd)pyrene (ppb)				Dibenz (a,h) Anthracene (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<10	<9.8	<9.6	<9.7	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10	<10	<10	<9.8	<10
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10	<9.8	<9.8	<9.9	<10
October	<9.7	<9.7	<9.6	9.7	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6	<9.5	<10	<9.6	<9.6
February	C	C	C	C	C	C	C	C
March	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6	<9.5	<9.6

Arkema **Stormwater Characterization**

Portland, OR **Semi-Volatile Organic Compounds**

2004/2005 Date	Benzo (g,h,i) perylene (ppb) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA
Febuary	*A*	*A*	*A*	*A*
March	<10	<9.8	<9.6	<9.7
April	<9.6	<9.6	<9.6	<9.6
May	<10	<10	<9.8	<10
June	*C*	*C*	*C*	*C*
July	*C*	*C*	*C*	*C*
August	<9.6	<9.6	<9.6	<9.6
September	<9.8	<9.8	<9.9	<10
October	<9.7	<9.7	<9.6	9.7
November	<9.6	<9.6	<9.6	<9.7
December	<9.6	<9.6	<11	<15
January	<9.5	<10	<9.6	<9.6
February	*C*	*C*	*C*	*C*
March	<9.5	<9.6	<9.5	<9.6

Arkema

Portland, OR

Stormwater Characterization

Organochlorine Pesticides

2004/2005	4,4'-DDE (ppb)				4,4'-DDD (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
March	0.13	0.28	<0.039	0.045	<0.040	<0.045	<0.039	<0.040
April	0.069	0.044	0.31	<0.039	<0.039	<0.039	<0.039	<0.039
May	<0.039	0.28	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039
June	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
July	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
August	<0.040	0.11	0.044	<0.039	<0.040	<0.039	<0.039	<0.039
September	0.018	0.11	0.085D	0.064	<0.0098	0.014	0.046D	0.025
October	0.17	0.26	0.14	0.16	0.077	0.082	0.038	0.082
November	0.047	0.10	0.057	0.029	0.018	0.016	0.017	0.0096
December	0.76D	0.25	0.11	0.24	0.062	0.035	0.050	0.056
January	0.20	0.28	0.097	0.11	0.038	0.038	0.017	0.041
February	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
March	0.37	0.19	0.043	0.052	0.040	0.032	0.011	0.023

2004/2005	4,4'-DDT (ppb)			
Date	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA
Febuary	*A*	*A*	*A*	*A*
March	0.46D	0.39	0.21	0.13
April	0.067	0.19	1.3*D*	0.058
May	<0.039	0.49D	0.063	0.14
June	*C*	*C*	*C*	*C*
July	*C*	*C*	*C*	*C*
August	0.073	0.41D	0.27	0.078
September	0.049	0.33	0.47D	0.29
October	0.58D	0.87D	0.53D	0.61D
November	0.14	0.30	0.16	0.087
December	0.72D	0.69D	0.57D	0.68D
January	0.36	0.80D	0.35	0.40D
February	*C*	*C*	*C*	*C*
March	0.45D	0.57D	0.17	0.16

Arkema

Portland, OR

Stormwater Characterization

Polychlorinated Biphenyls

2004/2005	Arochlor 1016 (ppb)				Arochlor 1221 (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
March	<0.99	<1.0	<0.98	<0.99	<0.99	<1.0	<0.98	<0.99
April	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
May	<0.96	<0.97	<0.98	<0.97	<0.96	<0.97	<0.98	<0.97
June	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
July	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
August	<0.99	<0.97	<0.96	<0.97	<0.99	<0.97	<0.96	<0.97
September	<0.98	<0.97	<0.96	<0.97	<0.98	<0.97	<0.96	<0.97
October	<1.0	<0.20	<0.95	<0.24	<2.0	<0.39	<1.9	<0.39
November	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
December	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
January	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
February	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
March	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96

2004/2005	Arochlor 1232 (ppb)				Arochlor 1242 (ppb)			
Date	OF #1	OF #2	OF #3	OF #4	OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
March	<0.99	<1.0	<0.98	<0.99	<0.99	<1.0	<0.98	<0.99
April	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
May	<0.96	<0.97	<0.98	<0.97	<0.96	<0.97	<0.98	<0.97
June	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
July	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
August	<0.99	<0.97	<0.96	<0.97	<0.99	<0.97	<0.96	<0.97
September	<0.98	<0.97	<0.96	<0.97	<0.98	<0.97	<0.96	<0.97
October	<1.0	<0.20	<0.95	<0.22	<1.0	<0.20	<0.95	<0.20
November	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
December	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
January	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
February	*C*	*C*	*C*	*C*	*C*	*C*	*C*	*C*
March	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96

Arkema
Portland, OR

Stormwater Characterization

Polychlorinated Biphenyls

2004/2005 Date	Arochlor 1248 (ppb) OF #1	OF #2	OF #3	OF #4	Arochlor 1254 (ppb) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA	NA	NA	NA	NA
Febuary	A	A	A	A	A	A	A	A
March	<0.99	<1.0	<0.98	<0.99	<0.99	<1.0	<0.98	<0.99
April	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
May	<0.96	<0.97	<0.98	<0.97	<0.96	<0.97	<0.98	<0.97
June	C	C	C	C	C	C	C	C
July	C	C	C	C	C	C	C	C
August	<0.99	<0.97	<0.96	<0.97	<0.99	<0.97	<0.96	<0.97
September	<0.98	<0.97	<0.96	<0.97	<0.98	<0.97	<0.96	<0.97
October	<1.0	<0.20	<0.95	<0.31	<1.7	<0.20	<1.2	<0.41
November	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
December	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
January	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96
February	C	C	C	C	C	C	C	C
March	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96

2004/2005 Date	Arochlor 1260 (ppb) OF #1	OF #2	OF #3	OF #4
January	NA	NA	NA	NA
Febuary	A	A	A	A
March	<0.99	<1.0	<0.98	<0.99
April	<0.96	<0.96	<0.96	<0.96
May	<0.96	<0.97	<0.98	<0.97
June	C	C	C	C
July	C	C	C	C
August	<0.99	<0.97	<0.96	<0.97
September	<0.98	<0.97	<0.96	<0.97
October	<1.0	<0.75	<0.95	<0.37
November	<0.96	<0.96	<0.96	<0.96
December	<0.96	<0.96	<0.96	<0.96
January	<0.96	<0.96	<0.96	<0.96
February	C	C	C	C
March	<0.96	<0.96	<0.96	<0.96

NA: Not applicable. New NPDS permit received January 28,2004.

A : Columbia Analytical Services Inc. did not analyze samples in a timely manner and most of the analytical holding times expired.

B : Result is total chromium. Hexavalent chromium analysis was not performed by Columbia Analytical Services, Inc. However,Redox Analysis showed a reading state indicating the Chromium is likely in a Trivalent state.

C : No Flow

D: The reported result is from a dilution.

E: Analytical results not received from laboratory in time to include in report.

ARKEMA

January 11, 2005

Mr. Raj Kapur
Department of Environmental Quality
Northwest Region
2020 SW 4th Avenue, Suite 400
Portland, Oregon 97201-4987

Dear Mr. Kapur:

Arkema Inc. (formerly ATOFINA Chemicals, Inc.) was issued a new NPDES discharge permit on January 22, 2004 for the discharge of storm water. Schedule C of the permit requires Arkema to conduct Storm Water Characterization monitoring once per month at each outfall for a one-year period. Arkema is required to submit the monitoring results on a quarterly basis to the DEQ Cleanup Project Manager. A report summarizing the one-year monitoring is to be submitted to the Department fourteen (14) months after the permit issuance date.

Arkema initiated the Storm Water Characterization sampling on February 17, 2004 and the samples were picked up by Columbia Analytical Services (CAS) the next day. Unfortunately, CAS did not analyze the samples in a timely manner and all analyte holding times, except for a few metals, were exceeded. Therefore, only analytical results for iron and manganese were reported for February 2004.

The one-year sampling period required in the permit should have extended from February 2004 through January 2005. Since most of the February 2004 samples were not analyzed by CAS, it would appear appropriate for Arkema to shift the one-year sampling period to extend from March 2004 through February 2005. This would mean the summary report would be due to DEQ on April 22, 2005 rather than March 22, 2005. Please let us know as soon as possible if this approach is acceptable to the Department. Attached is a copy of the most recent quarterly report.

If you have any questions, please contact me at 503-225-7210.

Sincerely,
Arkema Inc.

Larry D. Patterson
Environmental Manager

ARKEMA Inc.
6400 NW Front Avenue
Portland, Oregon 97210

503-228-7655 Fax: 503-225-7279
www.arkemagroup.com

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
FAX (503) 229-6945
TTY (503) 229-5471

March 3, 2004

Larry Patterson
ATOFINA Chemicals, Inc.
6400 N.W. Front Ave.
Portland, OR 97210

Re: Phase III Demolition Plan
ATOFINA Portland
ECSI No. 398

Dear Mr. Patterson:

The Oregon Department of Environmental Quality (DEQ) reviewed the February 13, 2004 *Phase III Demolition Work Plan* submitted by ATOFINA Chemcals, Inc. for their Portland Plant. The plan is approved with the following conditions.

1. Wall material from the Chlorate Warehouse, Chlorate Process Area, Chlorate Cell Room and the Boiler/Rectifier Room can be used on site for use as fill material, provided it is managed (i.e., stored and placed) within the area of existing perchlorate contamination or an alternative location acceptable to DEQ. The location of the material will need to be mapped for future reference.

2. Concrete floors within portions of the Chlorate Plant may need to be sealed. A determination on the need to seal portions of the Chlorate Plant floor, will be made after review of perchlorate stormwater monitoring data. For example, if perchlorate concentrations in stormwater prior to or after demolition of the Chlorate Plant exceed interim DEQ source control screening criteria, DEQ may require portions of the pad to be sealed or portions of the stormwater system to be modified (e.g., plugged).

3. As part of the evaluation of whether the Chlorate Plant floor needs to be sealed, DEQ requests that stormwater within the East Containment Area be sampled and tested for perchlorate.

For stormwater source control screening, DEQ is currently using five times the ambient water quality criteria (AWQC) or a DEQ Level II ecological risk assessment screening level value (SLV) if an AWQC is not available. This 5x standard is only for substances that do not bioaccumulate. DEQ recently calculated an aquatic SLV for perchlorate of 200 ug/L. The supporting documentation for this value will be forwarded to ATOFINA as soon as it is available.

If you have any questions, please contact me at (503) 229-5538

Sincerely,

Matt McClincy
Project Manager
Portland Harbor Section

cc: Rod Struck, NWR DEQ
Claudia Powers, Ater Wynne

Appendix L
Appendix A-2 of Lower Willamette Group Draft CSM Site Summary

ARKEMA INC.

(formerly ATOFINA Chemicals, Inc. or Elf Atochem North America, Inc.)
Oregon DEQ ECSI #398

6400 NW Front Avenue
DEQ Site Mgr: Matt McClincy
Latitude: 45.5708°
Longitude: -122.74°
Township/Range/Section: 1N/1W/13

River Mile: 7.3 West bank

LWG Member ☒ Yes ☐ No

Upland Analytical Data Status: ☒ Electronic Data Available ☐ Hardcopies only

1. SUMMARY OF POTENTIAL CONTAMINANT TRANSPORT PATHWAYS TO THE RIVER

The current understanding of the transport mechanism of contaminants from the uplands portions of the Arkema site to the river is summarized in this section and Table 1, and supported in the following sections.

According to the Upland RI Report (ERM 2004a), the following potential contaminant transport pathways have been identified:

- Surface water discharge (overland flow from the riverbank soils)
- Groundwater migration via advection and hydrodynamic dispersion
- Stormwater discharge via outfalls.

1.1. Overland Transport

With the exception of bank soils, there is expected to be little overland transport of contaminants via soil erosion. The northern third of the property consists of open fields of brush and healthy vegetation. The southern two-thirds of the property, where chemical manufacturing activities took place, is almost entirely paved, covered with gravel, or covered with a temporary cover systems. Stormwater that does not infiltrate the ground enters the facility's four permitted outfall systems. Overland sheet runoff to the river is not an applicable issue for this facility.

1.2. Riverbank Erosion

As shown in Figure 2-3 of Appendix B (Ecological Risk Assessment Approach) of the Portland Harbor Work Plan (Integral et al. 2004), the bank in the vicinity of Arkema is partial river beach and steep slopes covered with bank stabilization material that includes large chunks of concrete, asphalt, and other impervious material. There is no evidence of large-scale bank erosion, although there was minor sloughing of the bank between Docks 1 and 2 during the 1996 flood. Periodic monitoring of sediment stakes placed at low-, mid-, and high-bank elevations just north of Arkema's northern dock shows only relatively small-scale erosion and accretion (i.e., typically less than 5 cm in extent) in riverbank elevations between July 2002 and January 2004 (Anchor 2004).

1.3. Groundwater

Groundwater occurs within four distinct zones at the facility (shallow, intermediate, deep, and basalt zones). The depth of shallow groundwater at the facility varies from approximately 6 to 12 feet along the western property boundary to approximately 14 to 32 feet along the eastern property boundary, along the riverbank. The general direction of groundwater flow for all zones is towards the river. The point at which each zone discharges to the river is not fully known. However, it is likely that shallow groundwater may discharge to the river near the riverbank. Upward vertical hydraulic gradients were observed in the sediment and groundwater investigations conducted in the river, in the vicinity of Docks 1 and 2.

1.4. Direct Discharge (Overwater Activities and Stormwater/Wastewater Systems)

Stormwater from Arkema is discharged through four outfalls (Figure 1). These are described in Section 9.3.

1.5. Relationship of Upland Sources to River Sediments

Investigations conducted in the upland areas and in the river indicate that upland groundwater has contributed to contamination to river groundwater. DDT in river sediments adjacent to the property is primarily present due to historic discharges from a process discharge pipe located just north of Dock 1.

The primary transport mechanism to the river is dissolved-phase constituents in groundwater.

1.6. Sediment Transport

As shown in Figure 2-3 of Appendix B (Ecological Risk Assessment Approach) of the Portland Harbor Work Plan (Integral et al. 2004), the bank in the vicinity of Arkema is described as river beach. Evidence of large-scale bank erosion is unknown. Periodic monitoring of sediment stakes placed at low, mid, and high bank elevations at the downstream end of the Arkema property near RM 7 shows only relatively small-scale erosion and accretion (i.e., typically less than 5 cm in extent) in riverbank elevations between July 2002 and January 2004 (Anchor 2004).

As described in Section 2 of the Portland Harbor Work Plan (Integral et al. 2004), the Arkema property is located at the downstream end of a main channel depositional zone that extends from RM 7 to 10 based on Sediment Trend Analysis® and sediment-profile image survey data. This depositional zone appears to be a function of the relatively wide cross-sectional area in this reach. The river narrows as it approaches RM 7 and the channel transitions into a more dynamic sediment transport regime. There is no site-specific sediment transport information available for the nearshore portions of the site. However, time-series bathymetry change (January 2002 to February 2004) measurements of riverbed elevation between the channel boundary and the Arkema shoreline show net sediment accretion on the order of 1 foot along the upstream portion of the site (around and just downstream of the farthest upstream pier) and net erosion of about 1 foot along the site downstream of the middle pier (Integral and DEA in prep).

2. CSM SITE SUMMARY REVISIONS

Date of Last Revision: October 10, 2005

3. PROJECT STATUS

[Primary Source: ECSI file and DEQ Staff Report]

Activity		Date(s)/Comments
PA/XPA	☒	Preliminary Assessment (Elf Atochem 1999); Phase II Preliminary Assessment (Elf Atochem 2000)
RI	☒	Environmental Summary Report, Lots 1 and 2 (ERM 2003); Phase II Stage 1 & 2 In-River Groundwater and Sediment Investigation Report (Integral 2003); Upland Remedial Investigation Report, Lots 3 and 4 and Tract A (ERM 2004a)
FS	☐	
Interim Action/Source Control	☒	Remedial Action Report, North Plant Area (CH2M Hill 1995); Interim Remedial Measures Implementation Report (ERM 2001 – Phase I Soil Removal IRM); Phase II Soil Interim Remedial Measure (ERM 2002); Dense Non-Aqueous Phase Liquid Remediation Pilot Study Completion Report (ERM 2004b); Hexavalent Chromium Reduction Pilot Study Completion Report (ERM 2004c). Air Sparging/Soil Vapor Extraction Interim Remedial Measure Work Plan (ERM 2004d); Hexavalent Chromium Reduction Interim Remedial Measure Work Plan (ERM 2005a); In-Situ Persulfate Oxidation Interim Remedial Measure Work Plan (ERM 2005b).
ROD	☐	
RD/RA	☐	
NFA	☐	

DEQ Portland Harbor Site Ranking (Tier 1, 2, or 3): Tier 1

4. SITE OWNER HISTORY

Owner/Occupant	Type of Operation	Years
Arkema, Inc.	Inactive, site decommissioned	2004 – Present
ATOFINA Chemicals, Inc.	Chemical Manufacturing, site decommissioned	2000-2004
Elf Atochem North America, Inc.	Chemical manufacturing	1990 – 2000
Pennsylvania Salt Manufacturing/Pennwalt Corp.	Chemical manufacturing	1941 – 1989

5. PROPERTY DESCRIPTION

The site is located at 6400 N.W. Front Avenue in Portland, Oregon, along the west bank of the Willamette River, at approximately RM 7.5 in the Guild's Lake Industrial Sanctuary (formerly the Northwest Portland Industrial Sanctuary). The site is zoned and designated "IH" for heavy industrial use and is bordered on the east by the Willamette River, on the south by a roofing products company, and on the north and west by Front Avenue. Excluding the river bank, the site occupies approximately 55 acres and is generally flat with surface elevations of approximately 25 to 38 feet National Geodetic Vertical Datum (NGVD) 1929 (Figure 1).

The Arkema property is divided into four lots and one tract (Tract A) along the Willamette River bank [see Supplemental Figure 4 from ERM (2004a)]. Manufacturing processes took place on the southern

two lots at the site (Lots 3 and 4), with the northern portion of the site (Lots 1 and 2) left relatively undeveloped [Figure 1 and Supplemental Figure 4 from ERM (2004a)]. Lots 3 and 4 were developed with buildings, paved roads, rail spur access and associated tanks and piping in support of manufacturing processes. The plant has been decommissioned, and most of the facility infrastructure has been demolished and removed, concurrent with RI activities. Arkema maintains leases from the Department of State Lands (DSL) for the docks in the Willamette River.

6. CURRENT SITE USE

Arkema manufacturing operations ceased in 2001. Nearly all of the infrastructure associated with the manufacturing processes has been decommissioned and removed. Demolition was carried out in three phases. During Phase I, steel structures and tanks were removed. During Phase II buildings on Lot 3 and the northern portion of Lot 4 were demolished. Phase III demolition activities were completed during 2004 and included the removal of the remainder of building structures.

According to DEQ's ESCI database, Arkema still retains their RCRA large-quantity generator status. Remedial activities to address environmental contamination are ongoing.

7. SITE USE HISTORY

The facility was an inorganic chemical manufacturing facility from 1941 to 2001. It was constructed and operated by Pennsylvania Salt Manufacturing, which later became Pennwalt Corporation. Pennwalt was purchased by Societe Nationale Elf Aquitaine (ELF) in 1989, and in 1990 was combined with two other companies to form Elf Atochem North America, Inc. In 2000, Elf Atochem became ATOFINA Chemicals, Inc. ATOFINA changed its name to Arkema Inc. in October of 2004.

The plant began producing sodium chlorate and potassium chlorate in 1941 in the Sodium Chlorate Area [Figure 1 and Supplemental Figure 4 from ERM (2004a)]. Chlorate was produced by the electrolysis of sodium chloride solution, with sodium bichromate added as a corrosion inhibitor and to improve electrical efficiencies. Chlorate solutions were shipped from the facility by truck or barge (Dock 2). Potassium chlorate manufacturing, a process similar to the sodium chlorate operation, ended in 1978.

Sodium chloride was the primary raw material used at the site throughout its operation. It was historically delivered to the facility by ship. The salt was transferred and stored on asphalt-lined salt pads located in the southeastern corner of the site adjacent to the river [Figure 1 and Supplemental Figure 4 from ERM (2004a)].

Chlor-alkali operations started at the plant in 1946. Products included chlorine, sodium hydroxide, and hydrogen gas. Asbestos (used as a diaphragm in electrolytic cells) was historically buried in trenches on Lot 1. The trenches were excavated and the buried asbestos removed with DEQ oversight in 1992. Later, process waste asbestos was conveyed to a filter press, and the filter cake was placed in drums for offsite disposal. The plant never operated mercury chlorine cells.

Hydrochloric acid production began in 1966 in the general area where DDT was formerly manufactured. This area became known as the Acid Plant [Figure 1 and Supplemental Figure 4 from ERM (2004a)]. Chlorine and hydrogen were burned together in aboveground towers to form hydrogen chloride vapor. The vapor was absorbed in water to form hydrochloric acid. This production ceased in 2001.

The pesticide, dichlorodiphenyltrichloroethane (DDT), was manufactured at the facility from 1947 to 1954. Chemical base stocks used in the DDT manufacturing process included monochlorobenzene (MCB, or chlorobenzene), chloral, and sulfuric acid. Dry-processed DDT was placed in bags and shipped offsite by railcar. A small amount of DDT was dissolved in diesel fuel and loaded into trucks and possibly

railcars as a solution.

Manufacturing process residue (MPR) from DDT manufacturing was initially discharged to floor drains, apparently connected to a storm sewer that drained to the Willamette River (see figure 3a). From approximately 1948 until 1950, MPR was discharged to an unlined pond northeast of the manufacturing building. From 1950 until DDT manufacturing ceased in 1954, MPR was piped to a MCB recovery system for MCB recovery. Wastes in the recovery system were periodically drained to the MPR pond. The MCB recovery system was located immediately west of the former MPR pond. In 1951 or 1952, an 8-foot-wide by 285-foot-long trench was added to the north end of the disposal pond to increase capacity of the pond (DEQ 2003).

From 1958 to 1962, after DDT manufacturing ceased, ammonium perchlorate operations were conducted in the former DDT process building. During this period, sodium perchlorate was produced inside the chlorate cell-room. Sodium perchlorate was transferred to the acid plant area where it was converted to ammonium perchlorate by using ammonium chloride to form a solid propellant for guided missiles. The production of sodium perchlorate and ammonium perchlorate ceased in 1962.

Extensive, ongoing site investigations have occurred at Arkema since 1994. Arkema submitted an application to DEQ in June 1995 to participate in the Voluntary Cleanup Program (VCP). A Remedial Investigation (ERM 2004a) was initiated in 1998 and completed in January 2004.

8. CURRENT AND HISTORIC SOURCES AND COPCS

The understanding of the current and historic potential upland and overwater sources at the site is summarized in Table 1 and shown on Figure 4. Because the site has undergone extensive remediation and demolition, several of these areas are not considered current sources of contamination. The following sections provide a brief discussion of the potential sources at the site requiring additional discussion.

8.1. Uplands

- At the initiation of DDT manufacturing in late 1947, manufacturing process residue (MPR) was discharged to floor drains connected to a storm sewer that drained into the Willamette River. In 1948, MPR was conveyed to a newly constructed, shallow, unlined pond located northeast of the manufacturing building. Starting in 1950 until DDT manufacturing operations ceased in 1954, MPR was piped to an MCB recovery system, where chlorobenzene was removed from the residue and returned to the process. Occasionally, wastes from the recovery system were placed in the pond. In about 1951 or 1952, an 8-foot wide by 285-foot long trench was constructed north of the MPR pond to increase its capacity. Elevated concentrations of MCB and DDT were found in soil in this area prior to soil removal. In response to these elevated DDT and MCB concentrations, a two-phased soil removal/source control interim remedial measure (IRM) was implemented in 2000 and 2001. Impacted soil was removed in portions of the Acid Plant Area from depths of up to 12 feet below ground surface (bgs). Some DDT- and MCB-impacted soils remain on site in the Acid Plant Area (ERM 2004a).
- Sodium chlorate manufacturing started in 1941 in its current location (Figure 1). Chlorate was produced by electrolysis of a sodium chloride solution. Sodium bichromate was added to the process as a corrosion inhibitor and to improve the electrical efficiency of the process. Chlorate solutions were shipped either by truck or barge. Truck loading occurred on the southern side of the Chlorate Plant Area. Barge loading of chlorate solutions occurred at the No. 2 Dock.
- From 1958 to 1962, sodium perchlorate was produced inside the chlorate cell-room. This process was very similar to the sodium chlorate process. Sodium perchlorate was

only produced as a material input for the production of ammonium perchlorate. Production of all perchlorate products ceased in 1962.

- In 1958, ammonium perchlorate operations were conducted in the former DDT process building. Sodium perchlorate was converted to ammonium perchlorate by using ammonium chloride. This material was sold as a solid propellant for guided missiles. The operations were shut down in 1962. Some ammonium perchlorate handling took place in the No. 3 Warehouse, in the southeast corner of the Acid Plant Area (ERM 2004a).
- In 1994, Arkema excavated a trench on Lot 1 that contained DDT manufacturing process waste. Based on Section 5.1.2 of the Environmental Summary Report, Lots 1 and 2, the former DDT trench located on Lot 1 is a potential source area because very low concentrations of DDT, DDD, and DDE (all below DEQ industrial soil cleanup levels) are present in shallow soil in a discrete area between 3 and 14 feet bgs around the perimeter of the former trench. None of the 33 confirmation samples contained constituent pesticides greater than the USEPA Region 9 Preliminary Remediation Goal (PRG) for industrial soil. The report concluded that DDT is not likely to leach to groundwater (ERM 2003). Arkema has a DEQ approved Soil Management Plan to ensure proper management of these soils.
- Most of the former plant areas are covered with building foundations, asphalt paving, or gravel, which limits the potential for contact between stormwater and any remaining contaminated surface soils. Significant soil removals have occurred throughout the Arkema site during the remediation process. DDT- and chlorobenzene-impacted soil remains in the Acid Plant Area at depths up to 22 bgs. Soil containing DDT remains along the riverbank. Some chromium-impacted soil is found in the area of the Chlorate Cell Room (ERM 2004a).
- Chemical spills have occurred on the Arkema site over the years (see Section 8.3 below). For example, a 200-gallon spill of sodium hydroxide occurred in the old caustic tank farm (OCTF) in February 1996. Although most of the sodium hydroxide was recovered, some of the sodium hydroxide may have spilled on soils in this area (Elf Atochem 2000).
- A sandblast pile was located on the dirt surface north of Warehouse No. 3, adjacent to the plant's eastern fence line. Spent sand was routinely sampled for TCLP metals and recycled offsite. Sample results confirmed no or very low levels of metals detected in the sand.

8.2. Overwater Activities ☐ Yes ☒ No

Shipments of sodium chloride (salt) were historically delivered by ship to either the Salt Dock or Dock 1. Sodium hydroxide, sodium chlorate solution, and chlorine were loaded onto barges for shipment from Dock 2. Inadvertent spills during transfer activities may have occurred, but it is not likely they could have been sources of sediment contamination, as these materials are highly water-soluble or immediately volatilize upon release to the atmosphere. Sources, potentially impacted media, and COIs for overland activities are summarized in Table 1.

Arkema maintains leases from the DSL for the docks in the Willamette River.

8.3. Spills

Known or documented spills at the Arkema site were obtained either from DEQ's Emergency Response Information System (ERIS) database for the period of 1995 to 2004, from oil and chemical spills recorded from 1982 to 2003 by the U.S. Coast Guard and the National Response Center's centralized federal database [see Appendix E of the Portland

Harbor Work Plan (Integral et al. 2004)], from facility-specific technical reports, or from DEQ correspondence. These spills are summarized below:

Date	Material(s) Released	Volume Spilled (gallons)	Spill Surface (gravel, asphalt, sewer)	Action Taken (yes/no)
2/13/86	Ammonium hydroxide	1,200	Sewer	No
11/87	Sodium chlorate	Unknown	Sewer	Yes
6/8/93	50% Sodium hydroxide	225	Containment area	Yes
3/9/95	Fuel Oil	1	Dock 1/outfall area	Yes
2/23/96	Sodium hydroxide	200	Containment area	Yes

9. PHYSICAL SITE SETTING

Numerous subsurface explorations have been conducted at the Arkema site since approximately 1994. Investigation techniques have included test pits, direct-push, hollow stem auger, and cable-tool borings, installation of monitoring wells, vapor extraction wells, air sparging wells, sonic drilling, several remediation pilot studies, and in-situ IRM injections.

9.1. Geology

Results of the investigation indicated the following regarding site geology:

- The surficial geology at the site is characterized by fill and alluvial deposits of the Willamette River.
- The eastern portion of the site generally between Docks 1 and 2 has been filled with plant debris consisting of asphalt, concrete, pipe, soil, and fill from other sources (e.g., City of Portland). These materials occur from the surface to depths of approximately 25 feet bgs.
- The native soil profile is generally characterized by laterally discontinuous, alternating layers of dark gray-brown sand with varying amounts of silt and thinner silt layers with varying amounts of fine sand.
- Underlying the deepest silt layer, at a depth of approximately 35 feet, is a sand layer with black sands on the northern end of Lots 3 and 4 and dark gray-brown sands toward the southern end of the plant.
- Columbia River Basalt is observed below the fill and alluvium at the Site at depths of 49 to 55 feet bgs.

A cross-section layout map and cross-sections diagrams are provided as Figures 2a through 2d.

Fill materials occur from the surface to depths of approximately 25 feet bgs and consist of brown clayey silt to silty sand with occasional wood, brick, concrete, metal piping, and asphalt. Historically, fill materials were used to extend the ground surface out into the Willamette River. Filling activities started in about 1947 with minor quantities of fill material being placed on the riverbank immediately north of the No. 1 dock. The filling continued throughout the 1950's and by the mid-1960's there was a large volume of fill south of Dock 2. Fill thickness ranges from a few feet in the former DDT manufacturing area to approximately 25 feet along the riverbank. In some areas of the site, this has resulted in an extension of the ground surface into the river by up

to 150 to 200 feet.

The native soil profile is generally characterized by laterally discontinuous, alternating layers of dark gray-brown sand with varying amounts of silt and thinner silt layers with varying amounts of fine sand. These sands and silts are massive to finely laminated and the contacts between the sand and silt can be gradational. In Lots 3 and 4, there are four alternating sand and silt layers; a sand layer occurs at the ground surface, underlain by a silt layer at approximately 8 feet bgs, which is underlain by additional sand and silt layers. The sand and silt layers are continuous over most of the site, with the exception of the southeast portion of the site where the silt layers become less continuous.

Underlying the deepest silt layer, at a depth of approximately 35 feet, is a sand layer with black sands on the northern end of Lots 3 and 4 and dark gray-brown sands toward the south. A deeper silt layer with some clay and fine sand is situated beneath the black and dark gray-brown sand and above the basalt bedrock.

Columbia River Basalt is inferred at a depth below the fill and alluvium throughout the area. Basalt was detected in three monitoring well borings conducted as part of the RI, at depths of 49 to 55 feet bgs. These borings are located downgradient (east) of the Acid Plant Area.

9.2. Hydrogeology

Groundwater occurs in fill materials and four distinct groundwater zones beneath the Site. In general, the depth to groundwater increases from west to east across the Site (from Front Avenue toward the Willamette River). The following tables provide a summary of the four groundwater zones and their characteristics.

Shallow Unconfined Alluvial Aquifer	
Monitoring Wells	>50 (includes wells installed for monitoring of pilot studies).
Depth of Aquifer	Unconfined – ground surface to 32 feet bgs.
Depth to First Groundwater	6 to 12 feet on the west portion of the site; 14 to 32 feet on the east portion of the site (adjacent)
Saturated Thickness	~20 feet on west portion of site; ~10-15 feet adjacent to river.
Groundwater Flow Direction	East-northeast in the Acid Plant Area; east-southeast in the Chlorate Plant Area.
Hydraulic Gradient	0.0024 to 0.0069 ft/ft
Hydraulic Conductivity	5.9 ft/day to 34 ft/day (17 ft/day average)

Intermediate Confined Alluvial Aquifer	
No. of Monitoring Wells	11
Depth of Aquifer	36 to 46 feet bgs in the Acid Plant and Chlorate Plant Areas.
Saturated Thickness	5 to 10 feet
Groundwater Flow Direction	East-northeast in the Acid Plant Area; east-southeast in the Chlorate Plant Area.
Hydraulic Gradient	0.0038 to 0.0069 ft/ft
Hydraulic Conductivity	0.04 ft/day to 21 ft/day (5.8 ft/day average)

Deep Confined Alluvial Aquifer	
No. of Monitoring Wells	1
Depth of Aquifer	40 to 45 bgs
Saturated Thickness	Unknown
Groundwater Flow Direction	East-northeast
Hydraulic Gradient	Unknown
Hydraulic Conductivity	0.3 ft/day

Basalt Bedrock Aquifer	
No. of Monitoring Wells	1
Depth of Aquifer	45 to >70 feet bgs (maximum depth explored)
Saturated Thickness	Unknown
Groundwater Flow Direction	Northeast
Hydraulic Gradient	Unknown
Hydraulic Conductivity	Unknown

On the upland portion of the site, vertical hydraulic gradients between groundwater zones are primarily downward, with occasional upward gradients observed for well pair near the Willamette River.

Recharge to shallow groundwater at the site likely occurs from precipitation that infiltrates to the west of the site.

The silts separating the groundwater zones (aquitards) vary in thickness from approximately several inches to 5 feet across the site. The distinct groundwater zones have been observed across the entire site, with the exception of the southeastern portion of the site. In that area, downgradient of the Chlorate Plant Area, the silt aquitards tend to become discontinuous and the shallow and intermediate groundwater zones tend to coalesce.

The shallow groundwater surface fluctuates seasonally, rising during periods of high rainfall and infiltration and decreasing during mid- to late-summer and low rainfall periods. Shallow groundwater in close proximity to the Willamette River will rise in direct response to large increases in Willamette River stage (e.g., during a flood). In general, these short-term perturbations do not affect shallow groundwater flow directions with the exception of short-term groundwater flow reversals in close proximity to the river.

Prior to 2005, no seeps had ever been observed on Arkema property by Arkema personnel or during the Lower Willamette Group's recently conducted seep survey of riverfront properties. DEQ was notified of a seep of colored water in the summer of 2005 between Dock 1 and the salt dock.

10. NATURE AND EXTENT (*Current Understanding*)

The current understanding of the nature and extent of contamination for the uplands portions of the site is summarized in this section.

10.1. Soil

10.1.1. Upland Soil Investigations ☒ Yes ☐ No

During the RI (ERM 2004a), the primary chemicals of interest in soil were DDT and its metabolites, DDD and DDE; chlorobenzene; and hexavalent chromium. Numerous soil samples were collected, including samples taken from soil borings associated with remedial measures, a vapor extraction system, and monitoring well installation as well as

surface soil, soil borings, and riverbank samples.

The minimum and maximum soil detections at the Site for DDT, DDD, DDE, chlorobenzene, and total and hexavalent chromium are:

Constituent	Minimum	Maximum	Detection Limit
DDT (pre-RI)	Non-detect	150,000 mg/kg* (10 ft bgs)	0.0055 mg/kg
DDT	Non-detect	31,000 mg/kg (6-8 ft bgs)	0.0055 mg/kg
DDE (Pre-RI)	Non-detect	83 mg/kg (10 ft bgs)	0.0012 mg/kg
DDE	Non-detect	5,200 mg/kg (0.5-0.75 ft bgs)	0.0012 mg/kg
DDD (Pre-RI)	Non-detect	690 mg/kg (10 ft bgs)	0.0012 mg/kg
DDD	Non-detect	430 mg/kg (6-8 ft bgs)	0.0012 mg/kg
Chlorobenzene (Pre-RI)	Non-detect	43,000 mg/kg (10 ft bgs)	0.0011 mg/kg
Chlorobenzene	Non-detect	15,000 mg/kg (6-8 ft bgs)	0.0011 mg/kg
Total Chromium	9.5 mg/kg	1,600 mg/kg (10-12 ft bgs)	Unknown
Hex. Chromium	Non-detect	69 mg/kg (8-10 ft bgs)	1.6 mg/kg

* Removed during soil IRM.

DDT, DDD, and DDE – Surface soil samples were collected from seven locations, primarily in the vicinity of the Acid Plant and also south of Dock 1 and adjacent to the river [Supplemental Figure 4-10 from ERM (2004a)]. All of the elevated concentrations were located in the Acid Plant Area. Up to 1,600 mg/kg of DDT was detected in surface soil samples (defined as the top 4 inches of soil) collected at Stations S-7 and S-8 in the former MPR pond. Concentrations generally decrease with depth in the acid plant area except in the former MPR pond. DDT was also detected as high as 16,000 mg/kg at a depth of 4.5 to 6 feet bgs in soil boring B-53 in the former MPR pond (ERM 2004a). The soil from which this sample was collected was removed during a soil removal/source control IRM. Four thousand seven hundred tons of DDT-impacted soil was excavated and disposed of off-site. The IRM was conducted when the plant was still operating. The northwest and southeast corners of the pond were not excavated due to interferences with plant operations. The rest of the former MPR pond was excavated to a depth of 12 ft bgs. A trench off the northeast corner of the former MPR pond was also excavated to a depth of 8 ft bgs. The greatest DDT soil impacts occur in an area within 100 ft. of two sides of the former process building, the north and eastern sides. The highest DDT concentration currently existing in soil in this area is 13,000 mg/kg in the former MCB recovery system location (Boring IB-20, 3 to 4 feet bgs). Generally, DDD and DDE were detected at significantly lower concentrations (one to three orders of magnitude) than DDT throughout the Acid Plant Area. Depth to groundwater in the Acid Plant Area is approximately 20 feet bgs.

In 1992, a trench identified on the northern property (Lot 1) was found to contain what appeared to be pesticide residues. A sample from the trench confirmed the presence of DDT, as well as chlorobenzene. In the fall of 1992, Arkema conducted a soil exploration program to assess the horizontal and vertical extent of the affected soil in the trench. The investigation determined the top of the trench was approximately 30 feet wide by 80 feet long and approximately 10 to 11 feet deep. The top of the trench was located approximately 3 feet bgs. The trench was completely excavated in 1994 (CH2M Hill 1995). Removal of

DDT-impacted trench soils is discussed in Section 11.1.

Chlorobenzene (MCB) – During the RI and IRM activities, soil samples were collected from 62 borings and analyzed for VOCs. Concentrations of chlorobenzene up to 13,000 mg/kg (Boring VP-6, 7.5 to 8 feet bgs) were detected in the MCB recovery system location. The extent of highest chlorobenzene-impacted soil covers an area approximately 100 feet by 100 feet, just north of the former DDT process building in the MCB recovery system location. Soil in the vicinity of seven of the 32 borings installed as part of a vapor extraction system (VES) IRM was removed during the Phase I and II soil removal/source control IRMs. Additionally, temporary cover (asphalt paving) was installed over soil in the vicinity of three additional VES borings as part of the Phase II IRM. Chlorobenzene-impacted soils remain in a focused part of the Acid Plant Area at depths up to 16 feet bgs. Early RI activities performed in 1999 noted the presence of residual dense non-aqueous phase liquid (DNAPL) in soil in a shallow zone beneath the former MPR pond and in a thin zone downgradient of the former MPR pond and east of the Acid Plant Area. The detection of high concentrations of dissolved-phase chlorobenzene in monitoring wells in this area suggests that residual DNAPL might be a continuing source of dissolved chlorobenzene in groundwater (see Section 10.2.2). A pilot air sparge/soil vapor extraction system was installed in the fall of 2003 and has been operating since then with great success. Arkema installed a full-scale air sparge/soil vapor extraction system in the winter of 2004. The system consists of 21 air sparge wells, 17 soil vapor extraction wells, blowers, and 2 carbon absorbers.

Hexavalent Chromium – Chromium was observed in the Chlorate Plant Area soil at concentrations as high as 1,600 mg/kg in one sample up to 32 feet bgs. The highest concentrations were found near the Chlorate Cell Room and decreased to background concentrations within 250 feet of this area. Depth to groundwater in the Chlorate Plant Area is approximately 20 feet bgs.

10.1.2. Riverbank Samples

☒ Yes ☐ No

Exponent (1999) collected and analyzed seven riverbank samples from six locations (one was a duplicate sample) during the RI: three at the top of the slope, and three directly down slope, approximately 5 feet above the mean high-water elevation. All sample locations were between Dock 1 and 2 (Supplemental Figure 5). Samples were collected from between 0 and 6 inches bgs. DDT was detected in all samples at concentrations ranging from 2.3 to 120 mg/kg. The highest concentrations were detected in the northern sample location pair. Concentrations were higher in the top-of-slope sample than in the corresponding down-slope sample.

10.1.3. Summary

All ground surfaces within the former areas of the plant that were used for manufacturing are paved, covered by building foundations or have had temporary cover systems installed. Acid Plant Area soils still contain some DDT and MCB. Chlorate Plant Area soils still contain some hexavalent chromium. Because of the impervious nature of the ground surface over the areas with the most significant soil impacts, impacts to groundwater from soil-phase contamination is minimal.

10.2. Groundwater

10.2.1. Groundwater Investigations

☒ Yes ☐ No

The first groundwater investigation took place in 1994 in the Acid Plant Area to determine the presence and possible concentration of DDT and MCB in groundwater.

Since that time over 60 wells have been installed at the site. Wells have been installed for both general groundwater monitoring and performance monitoring of remedial technology pilot studies. Groundwater samples have been analyzed for organochlorine pesticides, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and other miscellaneous constituents. The most recently validated groundwater data set is from the June/July 2003 groundwater sampling event, included in Supplemental Tables 3 through 6 from ERM 2003. Additional performance monitoring data for groundwater IRM's is also available.

10.2.2. NAPL (Historic & Current) ☒ Yes ☐ No

Early RI activities conducted in 1999 noted the presence of historic, residual MCB dense non-aqueous phase liquid (DNAPL) in soil in the shallow zone beneath the former MPR pond and in a thin zone downgradient of the pond. The observed residual DNAPL was found primarily near the shallow zone/upper silt layer interface. The presence of elevated dissolved-phase chlorobenzene concentrations in MWA-15r (Section 4.0) suggested that residual DNAPL within the Acid Plant Area downgradient of the former MPR pond might be a continuing source of dissolved chlorobenzene in groundwater.

A two-phased DNAPL investigation was initiated in early 2002 in accordance with the *Work Plan for Dense Non-Aqueous Phase Liquid Investigation, Acid Plant Area, ATOFINA Facility, Portland, Oregon* (ERM 2002). The objective of the DNAPL investigation was to assess the extent of residual chlorobenzene DNAPL in the shallow and intermediate zones and to provide a basis for evaluating remedial alternatives. The Phase I field program utilized a combination of cone penetrometer testing, membrane interface probe (MIP) screening, and direct-push (Geoprobe®) groundwater sampling to characterize subsurface conditions. The Phase II field program was conducted to further characterize the nature and extent of residual MCB DNAPL in the shallow zone immediately downgradient of the former MPR pond and to evaluate the presence and extent of any residual MCB DNAPL in the intermediate zone.

The results of the Phase I DNAPL investigation indicate that the highest concentrations of chlorobenzene in shallow-zone groundwater occur immediately north and northeast of the former MPR pond, in a 5- to 6-foot thick zone directly above the shallow silt horizon. Residual DNAPL was detected at discrete depths in the shallow zone in each of the Phase II borings. Residual DNAPL was also detected at only one intermediate-zone elevation in one boring (of seven total borings) located near the middle of the former MPR pond. The DNAPL investigations concluded that the residual MCB DNAPL is distributed in the form of ganglia or microglobules coating soil particles, rather than in a continuous, pore-filling phase. DNAPL is primarily situated in the shallow zone, and, due to its residual nature, DNAPL is not likely migrating offsite. DNAPL has not been observed in the deep or basalt zones, nor was it observed in any of the borings along the shoreline during the In-Water Investigation (Integral 2003). A full-scale air sparge/soil vapor extraction system has been operating in the area of the former MPR pond since December 2004. Arkema started an in-situ oxidation interim remedial measure for treatment of chlorobenzene in groundwater in August 2005.

10.2.3. Dissolved Contaminant Plumes ☒ Yes ☐ No

There are four primary dissolved hazardous substance contaminant plumes on the site. The DDT and MCB plumes overlie each other in the Acid Plant Area, whereas the hexavalent chromium and perchlorate plumes overly each other in the Chlorate Plant Area. There is also a small perchlorate plume in the Acid Plant area most likely

associated with the past production of ammonium perchlorate. Chloride is present in groundwater over an extensive area of the site. The highest chloride concentrations in groundwater are found near the former salt pads. The greatest dissolved phase impacts to groundwater are in the shallow groundwater zone with decreasing impacts in the intermediate zone and minimal impacts in the deep zone. Plume maps are provided as Figures 3a through 3d.

Plume Characterization Status ☒ Complete ☐ Incomplete

The draft RI report has concluded that the investigations have adequately defined the nature and extent of COIs in upland groundwater and provide sufficient data for conducting the Baseline Risk Assessment and FS. The results of the upland RI are consistent with investigations conducted by Arkema in the nearshore area (in the vicinity of Docks 1 and 2).

Plume Extent

DDT (DDT, DDE, DDD)– DEQ's Fresh Water Chronic Water Quality Criterion was used to delineate the DDT plume (0.001 μg/L). The shallow groundwater zone DDT plume extends from slightly north of Dock 2 to the salt dock on the south and from the western edge of the former MPR pond on the west to the river. DDT was not detected in the deep groundwater zone in the last groundwater sampling event. There is also a small DDT plume in the intermediate zone south of Dock 1.

Chlorobenzene – DEQ's Fresh Water Chronic Water Quality Criterion was used to delineate the MCB plume (50 μg/L – for chlorinated benzenes). The shallow groundwater zone dissolved-phase chlorobenzene plume extends from just north of Dock 2 south to Dock 1 and from the mid-point of Warehouse No. 2 and the DDT process building to the Willamette River. The intermediate groundwater zone chlorobenzene plume is significantly smaller in extent than the shallow-zone plume. The intermediate zone chlorobenzene plume is situated between Docks 1 and 2 and is approximately 350 feet in width from north to south and extends from the west side of the former MPR pond east to the Willamette River. There is also a small chlorobenzene plume in the intermediate zone south of Dock 1.

Chromium – DEQ's Fresh Water Chronic Water Quality Criterion was used to delineate the chromium plume (0.011 mg/L). The shallow and intermediate hexavalent chromium plumes are situated on the south portion of Lot 4, primarily south of Dock 1. The shallow zone hexavalent chromium plume originates in the area of the Chlorate Cell Room and extends east towards the Willamette River. The width of the shallow plume is approximated at 800 feet and extends from approximately 150 feet north of Dock 1 south towards the southern edge of the salt pads. The intermediate zone plume initiates further downgradient and is situated within the footprint of the shallow zone plume.

Perchlorate – In the absence of Fresh Water Chronic or Acute Water Quality Criteria, the DEQ SLV of 0.200 mg/L was used to delineate the perchlorate plumes. The primary shallow and intermediate perchlorate plumes are of similar size and orientation to the shallow and intermediate hexavalent chromium plumes, located south of Dock 1. Additional smaller plumes occur in both the shallow and intermediate zones in isolated areas just south of Dock 2.

Min/Max Detections (Current situation)

The minimum and maximum groundwater plume detections at the site for the most recent round of groundwater sampling (June and July 2003) are:

Constituent	Minimum	Maximum	Detection Limit
DDT	Non-detect	282 μg/L	0.08 μg/L
DDE	Non-detect	0.233 μg/L	0.08 μg/L
DDD	Non-detect	28.4 μg/L	0.04 μg/L
Chlorobenzene	Non-detect	185,000 μg/L	0.5 μg/L
Hex. Chrome	Non-detect	9.79 mg/L	0.001 mg/L
Perchlorate	Non-detect	290 mg/L	0.02 mg/L

Current Plume Data

The most recent complete data is for samples collected in June and July 2003. The dissolved phase DDT (DDT, DDE, DDD) and MCB plumes are generally found in the Acid Plant Area, migrating in the direction of east-northeast. The hexavalent chromium and perchlorate plumes are generally located beneath the Chlorate Plant Area and migrate in the direction of east-southeast. The lateral extent of groundwater impacts is greatest in the shallow groundwater zone and decreases significantly with depth (from the intermediate to the deep and basalt groundwater zones). The nature and extent of the groundwater plumes at the Site are stable and well understood. The trends in the data have shown reductions in DDT and MCB since the prior site-wide groundwater sampling event conducted in April 2002.

Three pilot studies have been conducted at the site, which have contributed to further decreases in constituent concentrations in groundwater: the In-Situ Persulfate Pilot Study, the DNAPL Air Sparge Pilot Study, and the Hexavalent Chromium Reduction Pilot Study. All three pilot studies demonstrated that the tested technologies were effective at significantly reducing concentrations of their target constituents (DDT, MCB, and hexavalent chromium) in groundwater. These pilot studies are discussed in greater detail in Section 11.2. In December 2004, the DNAPL Air Sparge Pilot Study System was replaced with a full-scale air sparge/soil vapor extraction system. Full-scale groundwater in situ treatment technologies were also initiated in 2005 for treatment of hexavalent chromium and chlorobenzene.

Preferential Pathways

In order to determine whether the storm drain system at the Site acts as a conduit for constituents in groundwater, storm drain system manhole elevations were compared to groundwater elevations in monitoring wells nearest to the manholes. Invert elevations at 11 manholes in the Acid Plant and Chlorate Plant Areas were compared to minimum and maximum groundwater depths observed over the duration of the RI. Based on the comparison, it has been determined that storm drain system invert elevations are uniformly above groundwater in both the Acid Plant and Chlorate Plant Areas. Therefore, the storm drain system is not a potential transport pathway for COIs in groundwater. There are no other buried utilities/structures at the facility that would serve as preferential groundwater flow pathways.

Downgradient Plume Monitoring Points (min/max detections)

The following maximum and minimum concentrations are for the wells situated along the top of the riverbank, downgradient from the Acid Plant and Chlorate Plant Areas.

Monitoring wells downgradient from the Acid Plant Area include: MWA-2, -3, -4, -5, and -6r in the shallow groundwater zone and MWA-8i, -9i, -10i, -14i, -16i, and -17si in the intermediate groundwater zone. Wells downgradient of the Chlorate Plant Area include: MWA-18, -19, -29, and -30 in the shallow groundwater zone and wells MWA-31i, -32i, and -34i in the intermediate groundwater zone. The following data is from the most recent groundwater sampling event (June and July 2003):

Constituent	Minimum	Maximum	Detection Limit
DDT	Non-detect	0.362 μg/L	0.08 μg/L
DDE	Non-detect	0.233 μg/L	0.08 μg/L
DDD	Non-detect	3.97 μg/L	0.04 μg/L
Chlorobenzene	Non-detect	73,200 μg/L	0.5 μg/L
Hex. Chrome	0.00236 mg/L	1.15 mg/L	0.001 mg/L
Perchlorate	Non-detect	200 mg/L	0.02 mg/L

Visual Seep Sample Data

☐ Yes ☒ No

No seeps had been observed from the Arkema property until the summer of 2005. In July of 2005, DEQ was notified of a seep of colored water between Dock 1 and the Salt Dock.

Nearshore Porewater Data

Arkema has not collected any nearshore porewater data at the site.

Groundwater Plume Temporal Trend

- A decrease in dissolved-phase DDT and MCB concentrations has been observed during the most recent groundwater sampling event (comparison of June 2003 to April 2002).
- DDT concentrations have exhibited both slight increases and significant decreases since 1999. On average, DDT concentrations in Acid Plant Area wells have decreased by one half to one order of magnitude since 1999.
- MCB concentrations in wells adjacent to the riverbank have demonstrated slight increases since 1999, whereas MCB concentrations in the vicinity of the former MPR pond and MCB recovery area have decreased significantly.
- The data sets for chromium and perchlorate in groundwater are not extensive enough to discern temporal trends in their respective concentrations.

10.2.4. Summary

The dissolved groundwater plumes at the site are relatively stable and well-documented. Residual MCB DNAPL has been observed and a focused investigation has documented the nature and extent of DNAPL in the upland subsurface. DNAPL exists in residual form and is not readily mobile. DNAPL likely contributes to the continued presence of dissolved-phase MCB in groundwater. All initial upland sources have been removed; i.e., manufacturing processes are no longer occurring, thousands of tons of soil have been removed, and aggressive interim remedial source control measures have been pilot tested and full-scale in-situ treatment technologies have been implemented.

10.3. Surface Water

10.3.1. Surface Water Investigation ☒ Yes ☐ No

A surface water/stormwater outfall investigation was conducted and reported in the Draft RI Report.

10.3.2. General or Individual Stormwater Permit (Current or Past) ☒ Yes ☐ No

Individual NPDES Permit No. 100752 was issued to Arkema on January 2, 2004. The permit authorizes the discharge of stormwater from the facility through four outfalls known as Outfall Nos. 001 (WR-290), 002 (WR-362), 003 (WR-100), and 004 (WR-101). The permit requires Arkema to prepare and implement a stormwater pollution control plan. There are no City outfalls on Arkema's property. There are several abandoned outfalls that have been permanently plugged with concrete.

Permit Type	File Number	Start Date	Outfalls	Parameters/Frequency
Individual	68471	1/22/04	001, 002, 003, 004	Standard[1]/quarterly

[1] Total suspended solids, pH, copper, lead, zinc, and oil and grease.

Arkema also was a required to conduct stormwater characterization for constituents related to historical activities and 303(d) constituents. Monthly monitoring was required of all four outfalls for the following constituents for a period of one year: total dissolved solids, iron, manganese, mercury, hexavalent chromium, DDT, DDD, DDE, PAHs, PCBs, chlorobenzene, pentachlorophenol, perchlorate, and chloride. A report summarizing the one year monitoring effort was submitted to DEQ on May 18, 2005.

Do other non-stormwater wastes discharge to the system? ☐ Yes ☒ No

No off-site stormwater or other types of wastewater enter the stormwater system.

10.3.3. Stormwater Data ☒ Yes ☐ No

Stormwater was sampled during the RI during four separate sampling events from 1999 to 2001. Stormwater samples were collected in the Acid Plant Area from a storm drain system, prior to mixing with non-contact cooling water. Total DDT and its metabolites were detected at concentrations exceeding the DEQ chronic water quality criteria, suggesting that some pesticide-containing material was present in the stormwater. However, significant reductions of these constituents were observed in stormwater after the Phase I soil removal interim remedial measure was completed (ERM 2004a).

10.3.4. Catch Basin Solids Data ☐ Yes ☒ No

10.3.5. Wastewater Permit ☒ Yes ☐ No

10.3.6. Wastewater Data ☐ Yes ☒ No

Permit Type	Permit Number	Start Date	Outfalls	Volumes	Parameters/Frequency
Individual	68471	1/29/93 (expired)	Same as above	NA	See below

Wastewater from Arkema was formerly discharged through four outfalls. Non-contact cooling water from the Acid Plant discharged through outfall #2. Combustion chamber cooling water from the Acid Plant was pumped to a wastewater treatment system

(provided pH neutralization) and discharged through outfall #4. Cooling water from caustic evaporators was conveyed to outfall #2. Cooling water from the Chlorine Cell Room was conveyed to outfalls #3 and 4, and from the chlorine finishing process to outfall #1.

The former individual NPDES waste discharge permit required monitoring for flow, pH, conductivity, suspended solids, temperature, residual chlorine, chromium, lead, zinc, copper, and nickel. Historic average metal discharge concentrations were as follows: chromium: 0.0029 mg/L; lead: 0.0008 mg/L; zinc: 0.484 mg/L; copper: 0.0043 mg/L, and nickel: 0.0023 mg/L.

10.3.7. Summary

Arkema completed a 1-year stormwater runoff characterization program in early 2005 and submitted a summary report to DEQ on May 18, 2005. Once the characterization program is completed, a summary report will be submitted to DEQ. Since the stormwater NPDES permit was issued in January 2004, there have been no exceedances of permit limits. The permit does not contain limits for 303(d) or legacy constituents.

10.4. Sediment

10.4.1. River Sediment Data ☒ Yes ☐ No

Several river sediment investigations have occurred in the vicinity of the Arkema site since 1988. Sampling locations for each of these investigations are shown on Figure 1.

10.4.2. Summary

Table 2 presents a statistical summary for the analytes in surface and subsurface river sediment.

Integral (2003) performed site-specific sediment (and groundwater) sampling in the vicinity of Docks 1 and 2 in June 2002 and February through March 2003 (Figure 1, Table 2). Analytical results indicated that MCB and DDT are present in sediments and groundwater in this area. DDT concentrations greater than 1,000 µg/kg in surface sediment were found in samples collected from the landward side of the docks, with concentrations decreasing significantly beyond the docks. The highest DDT concentrations (>100,000 µg/kg) were found in samples collected from 7 to 14.5 feet below mudline on the landward side of Dock 1. These concentrations appear to be associated with a temporary MPR discharge pipe that was active in this vicinity as long as 50 years ago.

The highest and most frequently detected chemicals have been total DDT and PAH compounds as shown in Maps 4-13 and 4-31 of the Portland Harbor Programmatic Work Plan at locations between Docks 1 and 2 (Integral et. al 2004). As shown in Table 2, total DDT in surface sediment (defined as the top 12 inches) since 1988 have ranged from 8.2 to 84,909 µg/kg (Station OSS002 in 1999; Table 2). Subsurface total DDT concentrations have ranged from 18 to 4,764,000 µg/kg (Station WB-9 in 2003; Table 2). The highest concentrations at Station WB-9 are buried 8 to 10 feet below the surface sediment.

The highest 2,4-D (93 µg/kg) and 2,4-DB (130 µg/kg) concentrations in the initial study area (ISA) were found in surface sediment samples collected at Station SD080, located downstream of Arkema's property near the Bayer CropScience outfall (Figure 1, Table 2). Arkema never manufactured or handled these chemicals. Bayer CropScience is now Star Link Logistics Inc. DDT was handled and sold at the Star Link site. This sample

location is just upstream from one private and two municipal outfalls.

PAH compounds, particularly HPAHs, have also been consistently detected offshore of Arkema since 1988. Benzo(b)fluoranthene was detected as high as 11,000 µg/kg in surface sediment collected in 1999 at Station OSS004, located between the two docks (Figure 1, Table 2). The subsurface sediment sample collected at OSS004 contained 9,700 µg/kg benzo(b)fluoranthene (Table 2). Total PAHs for this same station ranged from 25.5 to 71,946 µg/kg in the surface sample and 14 to 135,180 µg/kg in the subsurface sample.

The highest chlorobenzene concentrations were found in surface (up to 34,000 µg/kg) and subsurface (up to 18,000 µg/kg) sediment samples collected in 1999 at Station OSS003, slightly east of Dock 2 (Table 2, Figure 1).

11. CLEANUP HISTORY AND SOURCE CONTROL MEASURES

11.1. Soil Cleanup/Source Control

Asbestos Trenches and Pond – Arkema operated asbestos diaphragm cells in the Chlorine Cell Room. These cells utilized an asbestos coated cathode and titanium anodes. The cells needed to be rebuilt periodically to improve their efficiency. Water was used to wash the asbestos diaphragm material from the cathode to two surface impoundments. A manually controlled pump was used to transfer the slurry to a third surface impoundment, located on Lot 2 of the Site. In the past, the ponds were periodically cleaned and the material was placed in trenches located on Lot 1 on the Site. This pond maintenance practice was reported to the DEQ (Elf Atochem 1999). By the late 1980s, approximately 12 trenches had been filled with asbestos-containing residue on the north end of the property. These trenches were believed to be approximately 60 ft long, 15 ft wide, and 15 ft deep. Pennwalt kept maps to identify the location of the trenches (ERM 2003).

In order to make the property useful for potential development, and to meet conditions in its renewed air permit, Arkema Chemicals undertook a project to decommission the ponds and to voluntarily excavate the trenches containing asbestos residues. The asbestos removal work was conducted under a work plan approved by the DEQ and under the agency's oversight. The procedure called for removal of all visible asbestos material, plus several additional inches of the surrounding soil. The project was completed in 1992 (Elf Atochem 1999). The cleanup action procedure was documented by the DEQ in a technical paper entitled *Excavation of Asbestos-Containing Material* (DEQ 1991) (ERM 2003).

DDT Trench – In 1992, a trench identified on the northern property was found to contain what appeared to be pesticide residues (ERM 2003). A sample of the trench residue was analyzed for organochlorine pesticides, semi-volatiles (by USEPA Method 8270), PCBs, and petroleum hydrocarbons. The only constituent that was detected was DDT. The sample was also analyzed for organic toxic constituents on the RCRA Characteristic Waste List. The only detected constituent was monochlorobenzene (MCB) (3.60 mg/L). Tests confirmed this trench held soils that contained residue from a DDT manufacturing process.

Because the trench was a clearly defined, discrete unit, the trench was completely excavated during the summer of 1994. Approximately 1,700 tons of soil were removed from the site and disposed at the Waste Management Subtitle C landfill in Arlington, Oregon. Post-excavation confirmation sampling showed that surrounding soils met Oregon's residential soil cleanup levels, the target cleanup level for the soil removal. After sampling was performed, the excavation was backfilled with clean fill to the ground surface (CH2M Hill 1995). Because the trench was originally located 3 feet below the ground surface,

backfilling resulted in 3 feet of clean fill over the former trench location. This soil removal action was documented in the *Remedial Action Report, North Plant Area*, dated April 1995 (CH2M Hill 1995).

Brine Residue Pile and Pond – Historically, sea salt (NaCl) was used as a raw material for products manufactured at the Arkema facility. The impurities calcium (Ca) and magnesium (Mg) were precipitated from the brine as calcium carbonate (CaCO3) and magnesium hydroxide (Mg[OH]2). These compounds (referred to as "brine residue" or "brine mud") were separated from the brine through clarification. Historically, the brine residue was removed from the bottom of a primary clarifier and disposed in either the brine residue pile or pond on the site (Figure 4-1 in the *Environmental Summary Report, Lots 1 and 2*; ERM 2003). In the early 1990s, the plant installed a filter press which eliminated the need to dispose of the material on the Site.

The brine pile was completely removed from the Site in February 1989 and the pond was completely removed in August 1992. A front-end loader was used to load the brine mud from the pile and pond into 10-yard truck and pups. The material in the pile was solid (no free liquids). Some free liquid was present in the pond from stormwater accumulation. The pile was initially removed so that all visible brine residue was removed, then an additional 6-inch soil cut was made to ensure removal of all brine residue materials. Over a foot of solids from the entire pond bottom and sidewall area was removed and mixed with the residue to absorb all free liquids. Visual inspection was made to ensure all brine residue material was removed. The material was transported to the Hillsboro Landfill and beneficially used as a soil amendment to the final landfill cap.

Phase I and II Soil Removal Interim Remedial Measures – During the implementation of RI field activities, evidence of DDT- and chlorobenzene-contaminated soil was observed in the Acid Plant Area. Elevated DDT and chlorobenzene concentrations were primarily identified from near ground surface to approximately 8 feet bgs. DDT and chlorobenzene were observed up to 22 feet bgs in the immediate vicinity of the former Acid Plant (boring B-61). In response to these elevated DDT and chlorobenzene concentrations, Arkema implemented a two-phased IRM to mitigate potential environmental impacts.

The Phase I soil removal IRM was performed at the site between September and November 2000. A total of approximately 3,800 tons of soil was excavated and removed from the MPR pond and trench as part of the Phase I soil IRM. Additionally, a temporary surface cover was constructed in the unpaved area east of the Acid Plant Area, where unpaved soil samples had been collected.

The Phase II soil removal IRM was carried out between 5 and 16 November 2001 in the Acid Plant Area. A total of 915 tons of contaminated soil was removed during the Phase II soil IRM. The Draft RI report concluded that the Phase I and II IRMs were effective in removing significant quantities of soil containing DDT and chlorobenzene and reduced the potential for transport of constituents in shallow soils (ERM 2004a).

Soil Vapor Extraction System – The Phase I and II soil IRMs were conducted to remove DDT-contaminated soils in and around the Acid Plant Area. However, no soil removal was conducted in the former MCB Recovery Unit Area due to high concentrations of chlorobenzene in shallow soil. A soil VES was installed in December 2000 to extract chlorobenzene mass from subsurface soils, thereby reducing chlorobenzene concentrations to allow disposal of the soil as a non-hazardous waste following future excavation activities. The system was expanded incrementally over 2-1/2 years of operation and ultimately included 5 horizontal extraction wells. The system was installed, operated, and monitored in accordance with the *Work Plan for Full-Scale Vapor Extraction System* (ERM 2000) and

subsequent work plan addenda approved by DEQ. This system was shut down during 2003.

Stormwater System Improvements – At the completion of the Phase I and II Soil Removal IRM's mentioned above, asphalt paving was placed over the area to direct stormwater directly to surface drains. A fill area on the eastern boundary of the Acid Plant area was also provided with a temporary impermeable cover to divert storm runoff directly to surface drains.

11.2. Groundwater Cleanup/Source Control

Cleanup and source control actions to date include the following:

***In-situ* Persulfate Pilot Study** – A pilot study was conducted in the vicinity of the former DDT manufacturing area, where MCB concentrations in groundwater have historically been the highest observed at the site. The study was initiated to determine the feasibility of persulfate injections on reduction of MCB mass in groundwater. During the pilot study, residual DNAPL was observed in one of the pilot study monitoring wells. Attempts were made to remove DNAPL, but none was recoverable. Although the pilot study was suspended because of the residual DNAPL and the DNAPL investigation was initiated, early results demonstrated that persulfate was a very effective in-situ technology for destruction of MCB and DDT in groundwater at the facility. A full-scale in-situ persulfate IRM/source control measure was approved by DEQ on July 13, 2005.

DNAPL Remediation Pilot Study – A pilot study was conducted in the location of the highest MCB concentrations observed during the DNAPL investigation. The pilot study was conducted to determine the feasibility and effectiveness of coupling air sparging with vapor extraction for remediation of DNAPL and dissolved-phase MCB. The pilot study was operated for approximately 5 months and resulted in the reduction of average MCB concentrations of about 60% (for the 10 wells sampled as part of the pilot study). The air sparge system was only operated for 2 months. Based on the success of the pilot study, a full-scale air sparging/vapor extraction IRM/source control measure was installed and has been operating since December 2004.

Hexavalent Chromium Reduction Pilot Study – A third pilot study was conducted at the site in the location of the highest chromium concentrations, downgradient of the Chlorate Cell Room. The study involved the injection of calcium polysulfide to reduce chromium from its hexavalent state to its trivalent state. Results of the study indicate that chromium concentrations decreased by an average of 95% approximately 15 weeks after the injection of calcium polysulfide. A full-scale Hexavalent Chromium Reduction IRM/source control measure was initiated during the summer of 2005 and is schedule for completion in 2006.

Bench Scale Perchlorate Pilot Study – A bench-scale study is currently being conducted to investigate the potential for bioremediation of perchlorate using native microbial populations and a variety of electron donors. The bench-scale study is nearing completion.

11.3. Other

Most buildings and plant structures were demolished during 2003 and 2004. The front office, docks, perimeter fence, and some concrete slabs were left in place as the RI/FS process proceeds.

11.4. Potential for Recontamination from Upland Sources

The majority of the DDT (DDT, DDE, DDD) in the sediments off-shore of the facility has been in place for over 50 years. The chlorobenzene present in the upland groundwater presents a source control issue because it is a cosolvent for DDT. The chlorobenzene in the

groundwater potentially could dissolve DDT. The perchlorate and chromium plumes may be a potential source via the groundwater to surface water pathway. Arkema is moving aggressively with significant success on programs to address chlorobenzene, DDT, chromium, and perchlorate in groundwater.

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Figure 2a – 2d. Cross Section Figures (ERM 2004a)
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Table 1. Potential Sources and Transport Pathways Assessment
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Figure 4-10. DDT, DDD, and DDE Concentrations in Surface Soil Samples (ERM 2004a)
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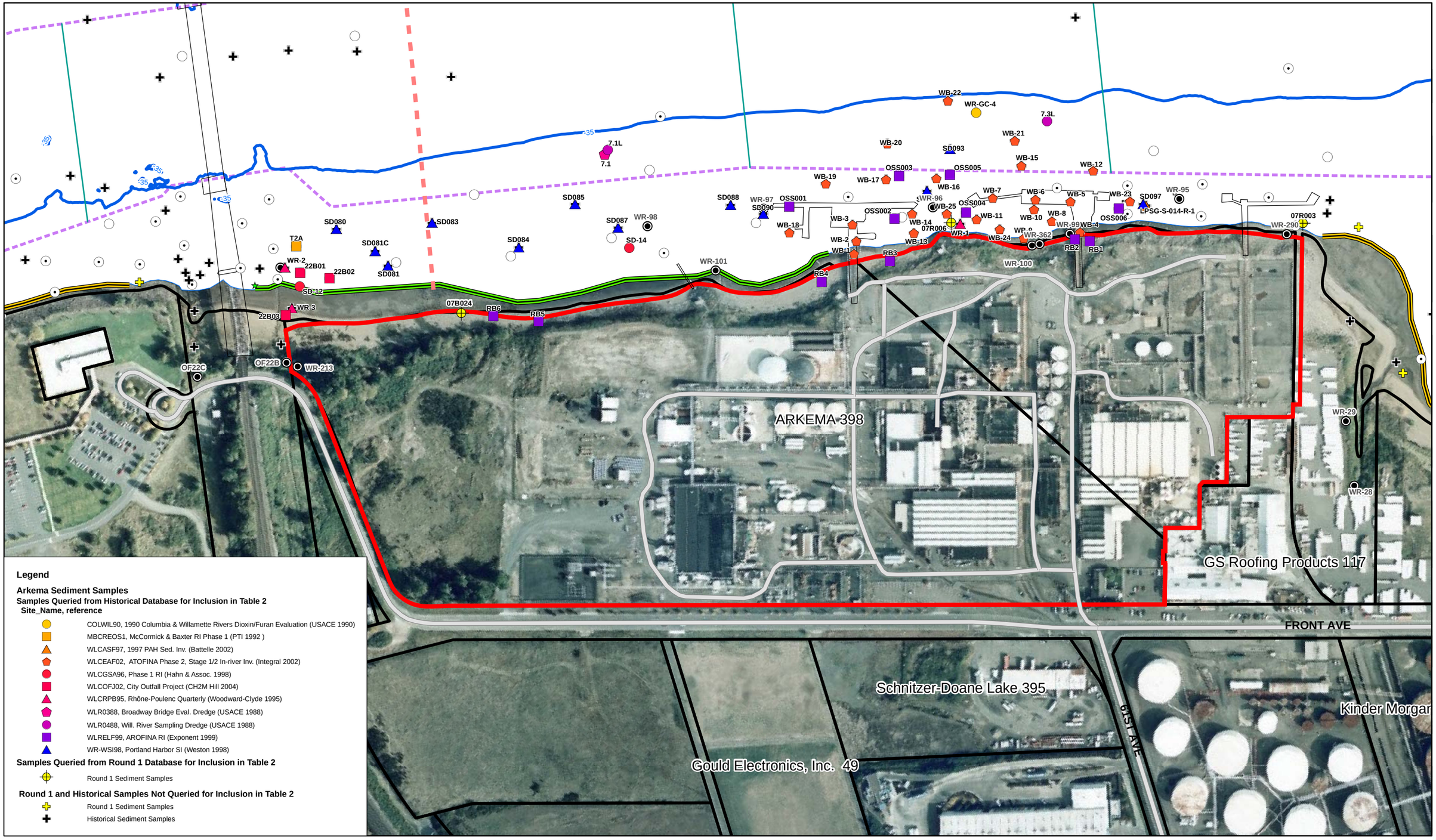
Table 3. Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results – June 2003 (ATOFINA 2003)
Table 4. Volatile Organic Compound Results – June 2003 (ATOFINA 2003)
Table 5. Polynuclear Aromatic Hydrocarbon and Total Petroleum Hydrocarbon Results – June 2003 (ATOFINA 2003)
Table 6. Pesticide Results – June 2003 (ATOFINA 2003)

FIGURES

Figure 1. Site Features
Figure 2a – 2d. Cross Section Figures (ERM 2004a)
Figure 3a – 3d. Groundwater Plume Maps



Legend

Arkema Sediment Samples

Samples Queried from Historical Database for Inclusion in Table 2

Site_Name, reference

- COLWIL90, 1990 Columbia & Willamette Rivers Dioxin/Furan Evaluation (USACE 1990)
- MBCREOS1, McCormick & Baxter RI Phase 1 (PTI 1992)
- WLCASF97, 1997 PAH Sed. Inv. (Battelle 2002)
- WLCEAF02, ATOFINA Phase 2, Stage 1/2 In-river Inv. (Integral 2002)
- WLCGSA96, Phase 1 RI (Hahn & Assoc. 1998)
- WLCOFJ02, City Outfall Project (CH2M Hill 2004)
- WLCRPB95, Rhône-Poulenc Quarterly (Woodward-Clyde 1995)
- WLR0388, Broadway Bridge Eval. Dredge (USACE 1988)
- WLR0488, Will. River Sampling Dredge (USACE 1988)
- WLRELF99, AROFINA RI (Exponent 1999)
- WR-WSI98, Portland Harbor SI (Weston 1998)

Samples Queried from Round 1 Database for Inclusion in Table 2

- Round 1 Sediment Samples

Round 1 and Historical Samples Not Queried for Inclusion in Table 2

- Round 1 Sediment Samples
- Historical Sediment Samples

integral consulting inc.

LWG Lower Willamette Group

Map Document: (G:\Projects\Portland_Harbor\LWG-Map-Projects\Conseptual_Site_Model\Sample_Locations_3rd_Group.mxd)
09/29/2005 -- 02:48:24 PM

Areal Photo Date: October 2001.
Base Map features from Portland Metro's RLIS.

Outfall information contained on this map is accurate according to available records; however, the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published (updated June 2005).

Legend

- Outfalls
- Seep Photo Location (Not location of actual Seep)
- Selected ECSI Site Property Boundary
- Navigation Channel
- Docks & In-water Structures
- River Miles
- -35ft. Contour (NAVD 88)

Human Use Areas

- Dockside Worker
- Recreational Beach Use
- Transient

LWG Round 2 Proposed Sediment Samples

- Surface Sample Only
- Core & Surface Sample

0 50 100 200 Feet

DRAFT

DO NOT QUOTE OR CITE. This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Figure 1-Site Features
Portland Harbor RI/FS
Conceptual Site Model
Arkema
ECSI 398

Project No. 5893.00
Date: 08/10/04
Drawn By: R. Olson
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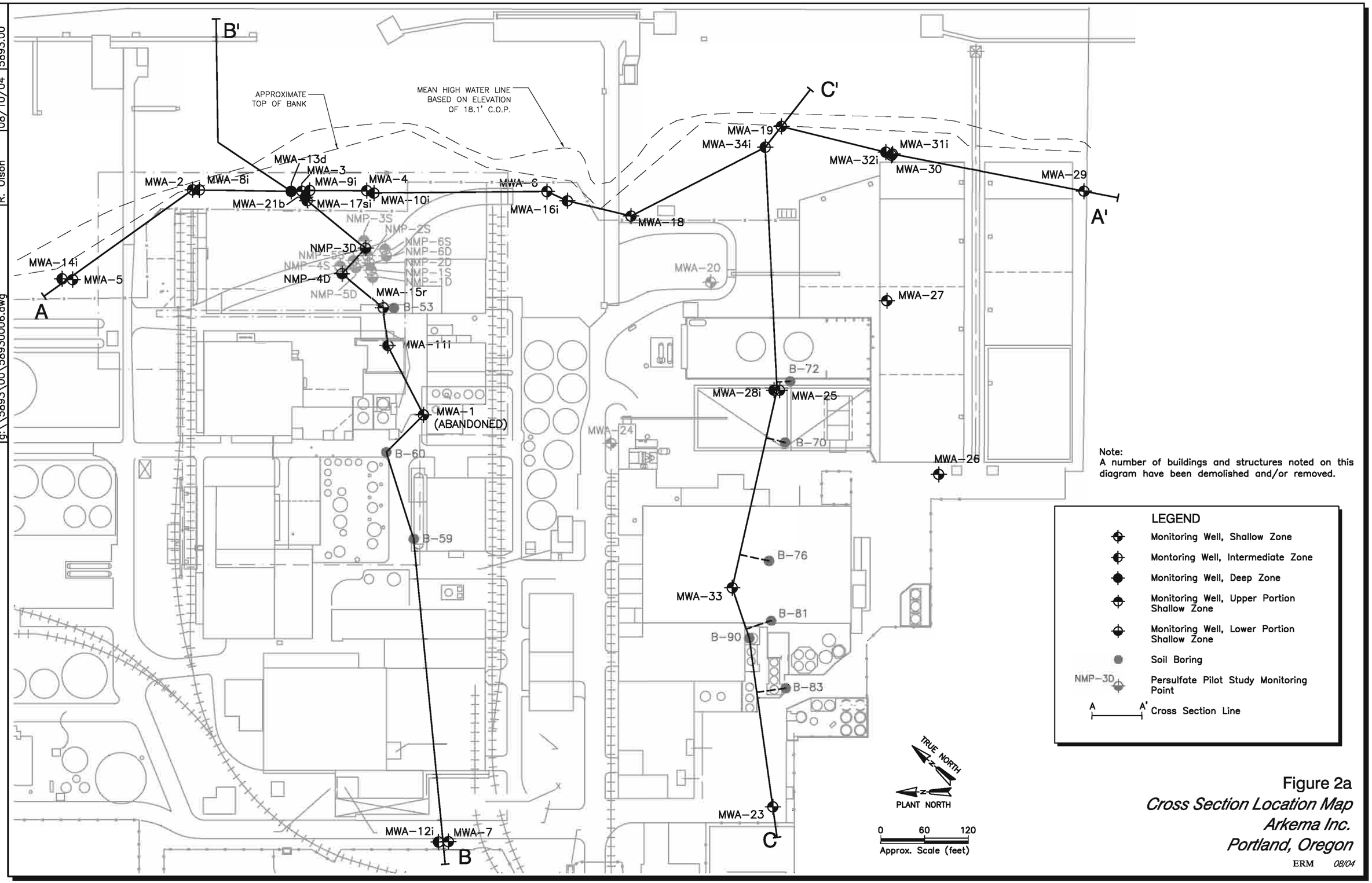

Note:
A number of buildings and structures noted on this diagram have been demolished and/or removed.

Figure 2a
Cross Section Location Map
Arkema Inc.
Portland, Oregon

ERM 08/04

Project No. 5893.00
Date: 08/10/04
Drawn By: R. Olson
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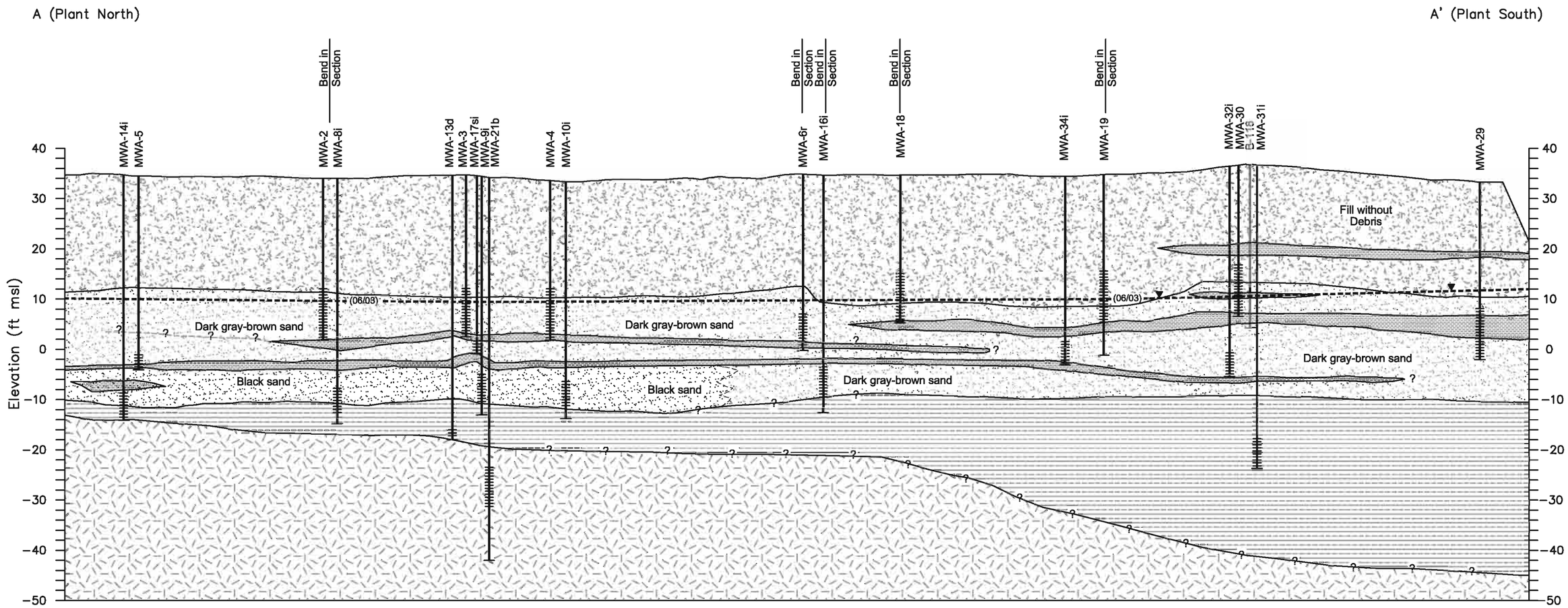


LEGEND

- Fill with debris
- Sand with varying amounts of silt
- Silt with varying amounts of fine sand
- Silt with some clay and fine sand
- Basalt

Source: E^x^ponent

- B-59 — Geoprobe® boring number
- MWA-1 — Well number
- Cased interval
- Screen interval
- Shallow-zone groundwater surface (approximate); June 2003
- Inferred soil or geologic contact (queried where uncertain)

(Vertical Exaggeration = 5X)

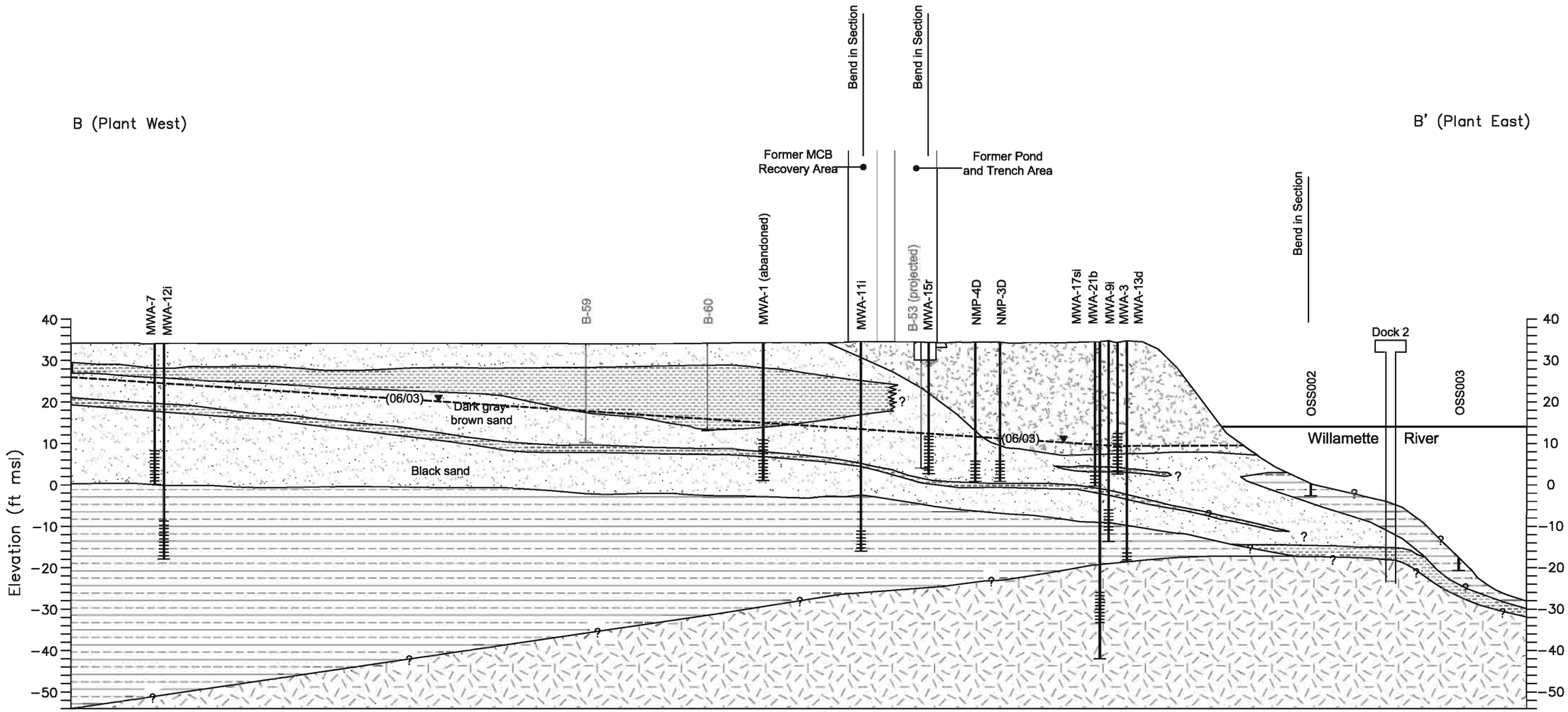
VERTICAL SCALE IN FEET 1" = 20'

HORIZONTAL SCALE IN FEET 1" = 100'

Figure 2b
Cross Section A-A'
Arkema Inc.
Portland, Oregon

ERM 08/04

Project No. 5893.00
Date: 08/10/04
Drawn By: R. Olson
CAD File: g:\5893\00\5893008.dwg



LEGEND

- Fill with debris
- Sand with varying amounts of silt
- Silt with varying amounts of fine sand
- Silt with some clay and fine sand
- Basalt

Source: E^x^ponent

- B-59 — Geoprobe® boring number
- MWA-1 — Well number
- Cased interval
- Screen interval
- Shallow-zone groundwater surface (approximate); June 2003
- Inferred soil or geologic contact (queried where uncertain)
- OSS002 Offshore sediment sample location

(Vertical Exaggeration = 4X)

0 — 25

APPROX. VERTICAL SCALE IN FEET 1" = 25'

0 — 100

APPROX. HORIZONTAL SCALE IN FEET 1" = 100'

Figure 2c
Cross Section B-B'
Arkema Inc.
Portland, Oregon

ERM 08/04

Project No. 5893.00
Date: 08/10/04
Drawn By: R. Olson
CAD File: g:\5893\00\58930009.dwg

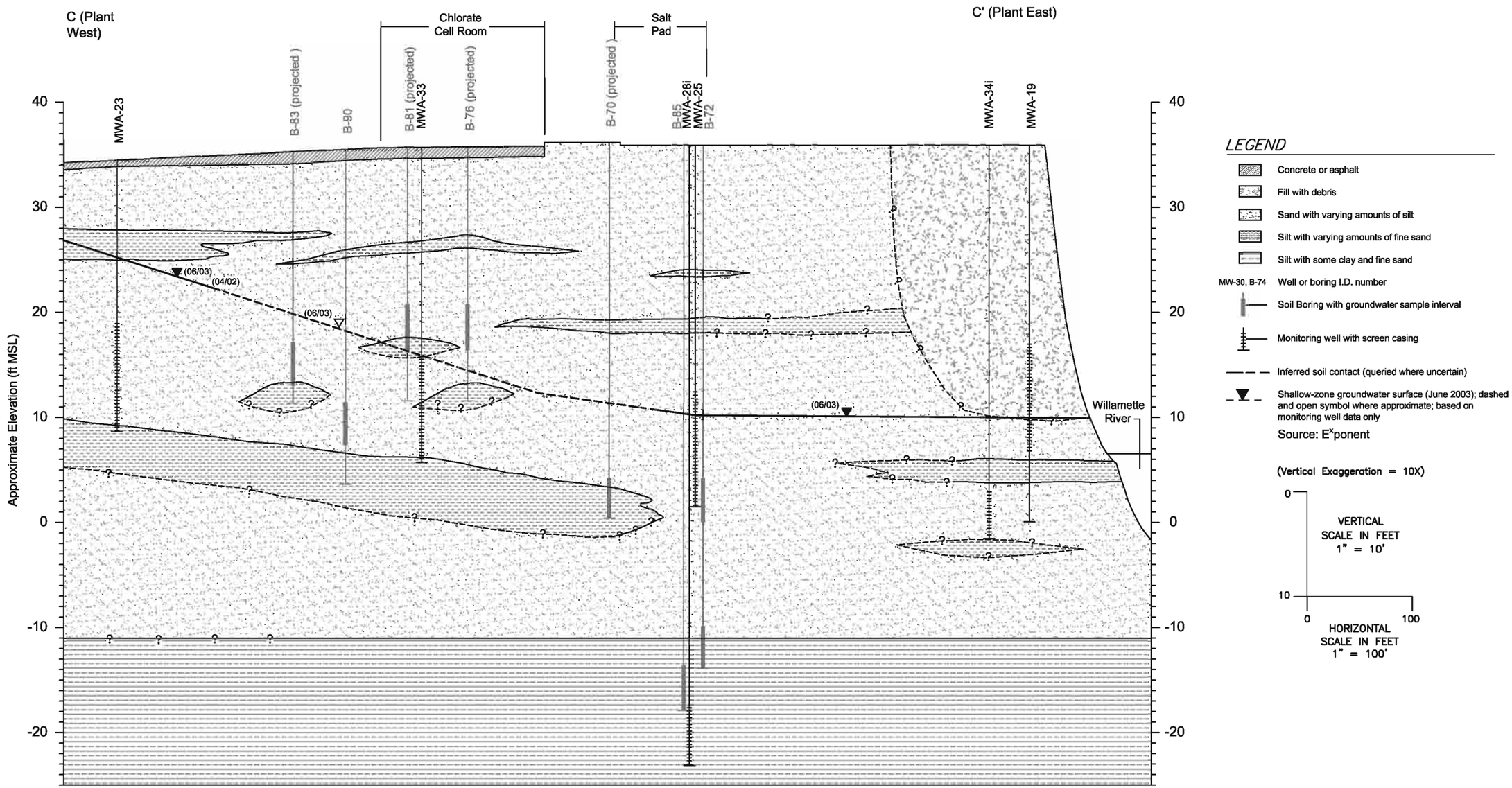
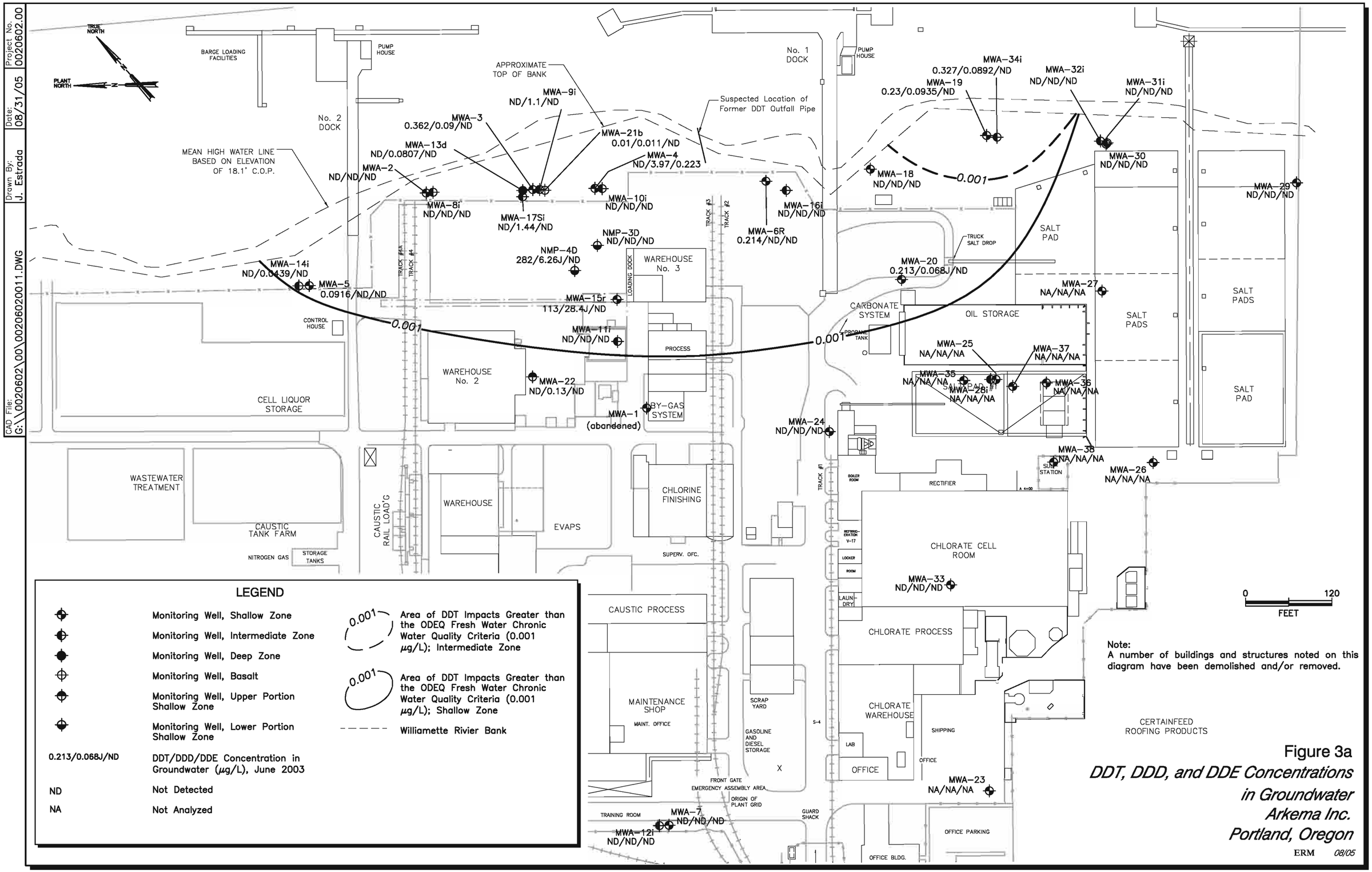


Figure 2d
Cross Section C-C'
Arkema Inc.
Portland, Oregon

ERM 08/04

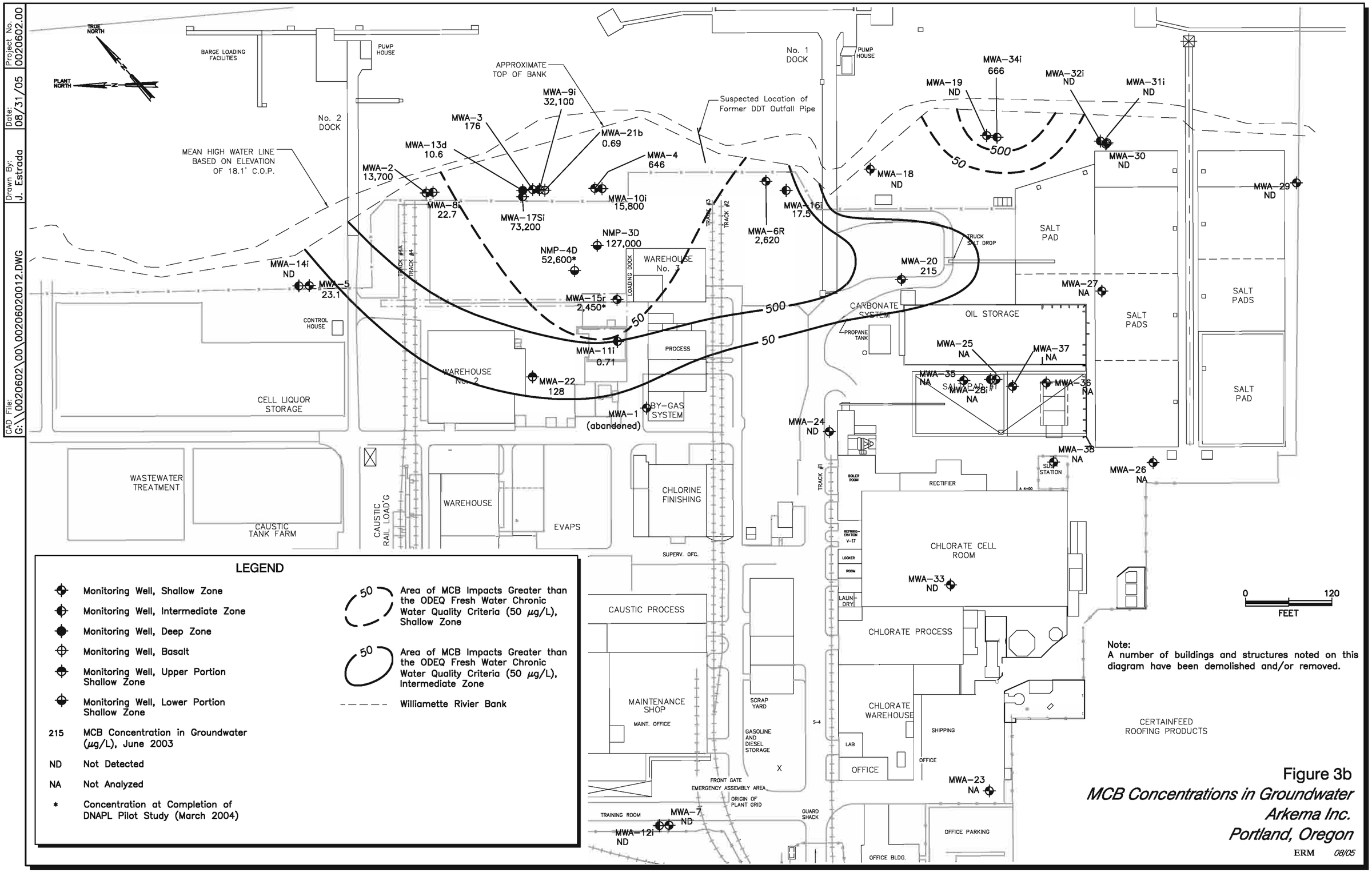


Note:
A number of buildings and structures noted on this diagram have been demolished and/or removed.

Figure 3a

DDT, DDD, and DDE Concentrations in Groundwater
Arkema Inc.
Portland, Oregon

ERM 08/05



Note:
A number of buildings and structures noted on this diagram have been demolished and/or removed.

Figure 3b
MCB Concentrations in Groundwater
Arkema Inc.
Portland, Oregon

ERM 08/05

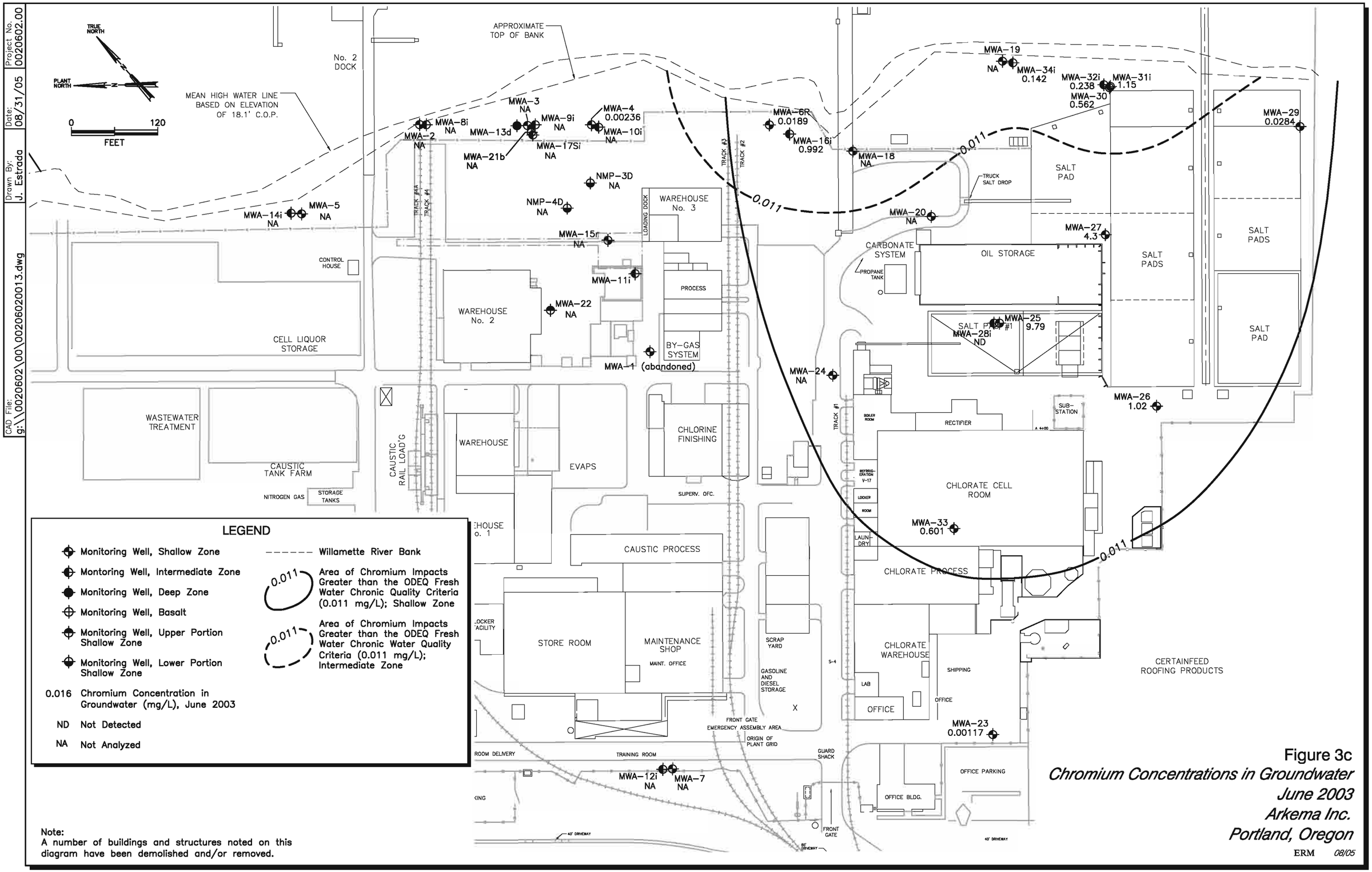


Figure 3c
Chromium Concentrations in Groundwater
June 2003
Arkema Inc.
Portland, Oregon

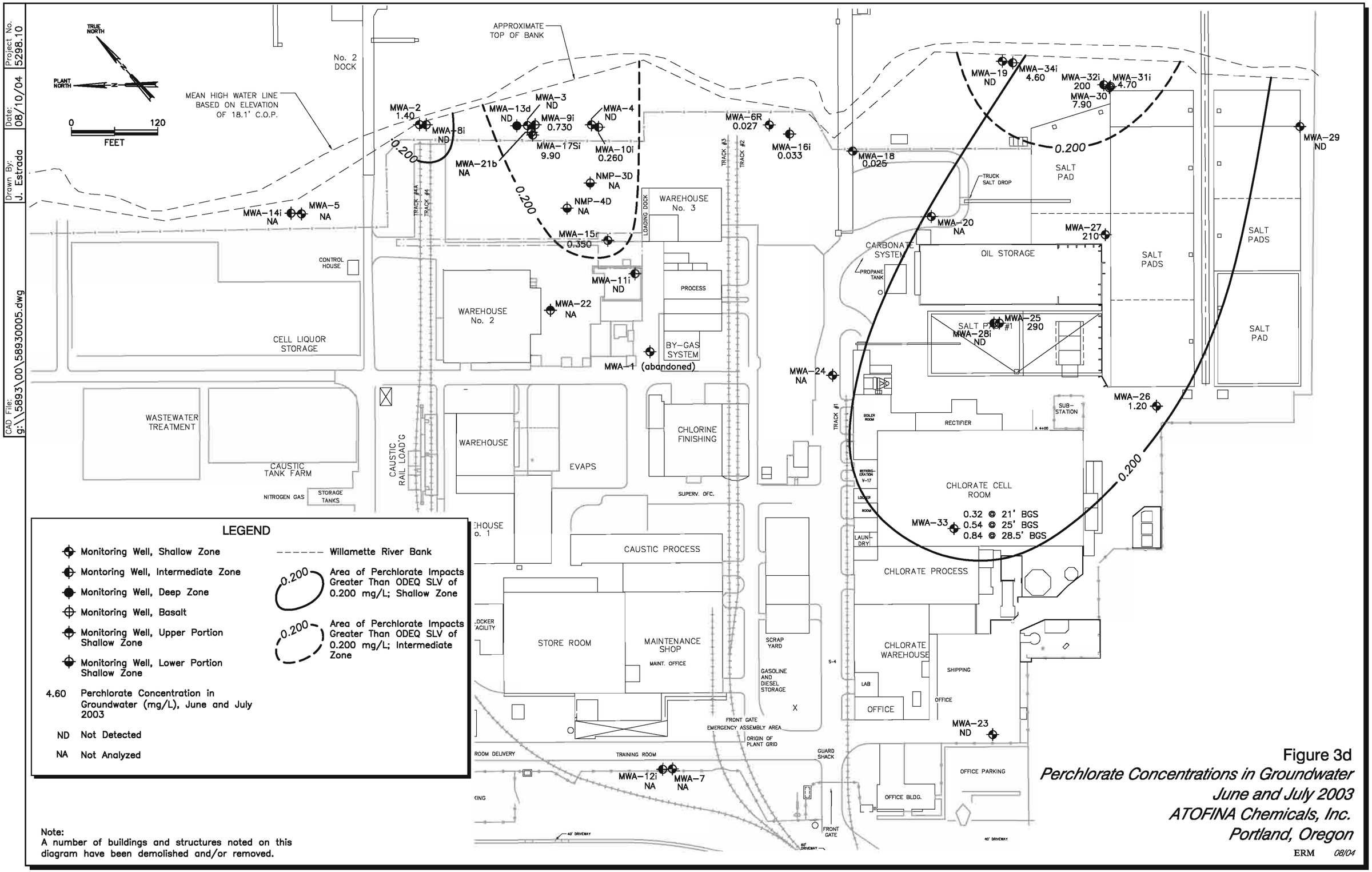


Figure 3d

Perchlorate Concentrations in Groundwater
June and July 2003
ATOFINA Chemicals, Inc.
Portland, Oregon

ERM 08/04

TABLES

Table 1. Potential Sources and Transport Pathways Assessment
Table 2. Surface and Subsurface Sediment Chemical Statistics near ARKEMA

Arkema #398

Table 1. Potential Sources and Transport Pathways Assessment

Potential Sources	Media Impacted					COIs																	Potential Complete Pathway				
						TPH			VOCs																		
Description of Potential Source	**Surface Soil**	**Subsurface Soil**	**Groundwater**	**Catch Basin Solids**	**River Sediment**	**Gasoline-Range**	**Diesel - Range**	**Heavier - Range**	**Petroleum-Related (e.g. BTEX)**	**VOCs**	**Chlorinated VOCs**	**SVOCs**	**PAHs**	**Phthalates**	**Phenolics**	**Metals**	**PCBs**	**Herbicides and Pesticides**	**Dioxins/Furans**	**Butyltins**	**Ammonia**	**Perchlorate**	**Overland Transport**	**Groundwater**	**Direct Discharge - Overwater**	**Direct Discharge - Storm/Wastewater**	**Riverbank Erosion**
Upland Areas																											
Former unlined MPR pond and trench	✓	✓	✓								✓							✓						✓			
Historic discharge through pipe					✓						✓							✓								✓	
Unpaved areas with contaminated soils	✓	✓														✓		✓					?			?	?
Historic spill areas	✓	✓	✓													✓					✓						
Stormwater discharge outfalls				✓														✓								?	
Contaminated groundwater plume			✓								✓	✓				✓		✓				✓		✓			
Overwater Areas																											
Other Areas/Other Issues																											

Notes:

[1] All information provided in this table is referenced in the site summaries. If information is not available or inconclusive, a ? may be used, as appropriate. No new information is provided in this table.

✓ = Source, COI are present or current <u>or</u> historic pathway is determined to be complete or potentially complete.

? = There is not enough information to determine if source or COI is present or if pathway is complete

Blank = Source, COI and Historic and Current pathways have been investigated and shown to be not present or incomplete

UST Underground storage Tank
AST Above-ground Storage Tank
TPH Total Petroleum Hydrocarbons
VOCs Volatile Organic Compounds
SVOCs Semi-volatile Organic Compounds
PAHs Polycyclic aromatic hydrocarbons
BTEX Benzene, toluene, ethylbenzene, and xylenes
PCBs Polychorinated biphenols

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	Aroclor 1016	(ug/kg)	6	0							380 U	2000 U	955	980 U	1000 U
Surface	Aroclor 1242	(ug/kg)	6	0							380 U	2000 U	955	980 U	1000 U
Surface	Aroclor 1248	(ug/kg)	6	0							380 U	2000 U	955	980 U	1000 U
Surface	Aroclor 1254	(ug/kg)	6	0							380 U	2000 U	955	980 U	1000 U
Surface	Aroclor 1260	(ug/kg)	6	0							380 U	2000 U	955	980 U	1000 U
Surface	Aroclor 1221	(ug/kg)	6	0							750 U	4000 U	1920	2000 U	2000 U
Surface	Aroclor 1232	(ug/kg)	6	0							380 U	2000 U	955	980 U	1000 U
Surface	Polychlorinated biphenyl	(ug/kg)	9	0							4 UJ	4000 UA	1280	760 UA	2000 UA
Surface	Butyltin ion	(ug/kg)	1	0							5.7 U	5.7 U	5.7	5.7 U	5.7 U
Surface	Dibutyltin ion	(ug/kg)	1	0							5.7 U	5.7 U	5.7	5.7 U	5.7 U
Surface	Dibutyltin ion	(ug/l)	1	0							0.06 U	0.06 U	0.06	0.06 U	0.06 U
Surface	Tributyltin ion	(ug/kg)	1	1	100.0	44	44	44	44	44	44	44	44	44	44
Surface	Tributyltin ion	(ug/l)	1	0							0.02 U	0.02 U	0.02	0.02 U	0.02 U
Surface	Tetrabutyltin	(ug/kg)	1	0							5.7 U	5.7 U	5.7	5.7 U	5.7 U
Surface	Tetrabutyltin	(ug/l)	1	0							0.02 U	0.02 U	0.02	0.02 U	0.02 U
Surface	Total solids	(%)	4	4	100.0	26.5	73.8	59.7	65	73.5	26.5	73.8	59.7	65	73.5
Surface	Total organic carbon	(%)	35	35	100.0	0.06	4.51	1.2	1.3	2.3	0.06	4.51	1.2	1.3	2.3
Surface	Moisture	(%)	4	4	100.0	39	220	87.8	41	51	39	220	87.8	41	51
Surface	pH	(pH units)	4	4	100.0	6.4	7	6.6	6.4	6.6	6.4	7	6.6	6.4	6.6
Surface	Specific Gravity	(Std.units)	4	4	100.0	2.49	2.75	2.67	2.71	2.74	2.49	2.75	2.67	2.71	2.74
Surface	2,3,7,8-Tetrachlorodibenzo-p-dioxin	(ng/kg)	5	1	20.0	3.4	3.4	3.4	3.4	3.4	0.24 U	3.4	1.47	0.41 U	3 U
Surface	Tetrachlorodibenzo-p-dioxin	(ng/kg)	4	3	75.0	11	66	30.3	14	14	0.93 U	66	23	11	14
Surface	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	(ng/kg)	5	0							0.44 U	3 U	1.28	0.63 U	1.9 U
Surface	Pentachlorodibenzo-p-dioxin	(ng/kg)	4	0							0.85 U	3.6 U	1.69	1 U	1.3 U
Surface	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	(ng/kg)	5	0							0.4 U	4 U	1.69	0.58 U	3 U
Surface	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	(ng/kg)	5	2	40.0	2	15	8.5	2	2	1.3 U	15	4.48	2 U	2.1 U
Surface	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	(ng/kg)	5	2	40.0	1 J	9.4	5.2	1 J	1 J	1 J	9.4	2.82	1.2 U	1.4 U
Surface	Hexachlorodibenzo-p-dioxin	(ng/kg)	4	4	100.0	5	85	25.1	5.2	5.2	5	85	25.1	5.2	5.2
Surface	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	(ng/kg)	5	5	100.0	26	380	104	40	40	26	380	104	40	40
Surface	Heptachlorodibenzo-p-dioxin	(ng/kg)	4	4	100.0	83	740	250	87	88	83	740	250	87	88
Surface	Octachlorodibenzo-p-dioxin	(ng/kg)	5	5	100.0	250	3600	970	330	350	250	3600	970	330	350
Surface	2,3,7,8-Tetrachlorodibenzofuran	(ng/kg)	5	5	100.0	1.6	20	10.7	8.5	19	1.6	20	10.7	8.5	19
Surface	Tetrachlorodibenzofuran	(ng/kg)	4	4	100.0	6.1	91	46.8	20	70	6.1	91	46.8	20	70
Surface	1,2,3,7,8-Pentachlorodibenzofuran	(ng/kg)	5	4	80.0	5	86	34.3	6.2	40	0.97 U	86	27.6	6.2	40
Surface	2,3,4,7,8-Pentachlorodibenzofuran	(ng/kg)	5	2	40.0	10	22	16	10	10	0.65 U	22	7.75	3.8 U	10
Surface	Pentachlorodibenzofuran	(ng/kg)	4	4	100.0	6.2	180	64.1	9.2	61	6.2	180	64.1	9.2	61
Surface	1,2,3,4,7,8-Hexachlorodibenzofuran	(ng/kg)	5	4	80.0	6.7	140	51.9	11	50	1.2 U	140	41.8	11	50
Surface	1,2,3,6,7,8-Hexachlorodibenzofuran	(ng/kg)	5	2	40.0	10	65	37.5	10	10	1.9 U	65	17.8	9.6 U	10
Surface	1,2,3,7,8,9-Hexachlorodibenzofuran	(ng/kg)	5	0							0.18 U	3.5 U	1.48	0.41 U	3 U
Surface	2,3,4,6,7,8-Hexachlorodibenzofuran	(ng/kg)	5	2	40.0	7 J	13	10	7 J	7 J	0.41 U	13	4.9	3.3 U	7 J
Surface	Hexachlorodibenzofuran	(ng/kg)	4	4	100.0	5.2	260	88.7	6.7	83	5.2	260	88.7	6.7	83
Surface	1,2,3,4,6,7,8-Heptachlorodibenzofuran	(ng/kg)	5	4	80.0	6.3	90	31.2	8.3	20 J	6.3	90	40.1	20 J	76 U
Surface	1,2,3,4,7,8,9-Heptachlorodibenzofuran	(ng/kg)	5	3	60.0	5 J	33	14.7	6	6	1.1 U	33	9.34	5 J	6
Surface	Heptachlorodibenzofuran	(ng/kg)	4	4	100.0	12	160	88.8	33	150	12	160	88.8	33	150
Surface	Octachlorodibenzofuran	(ng/kg)	5	5	100.0	15	330	119	90 J	120	15	330	119	90 J	120
Surface	Gravel	(%)	29	29	100.0		13.3	1.89	0.29	6.47	0	13.3	1.89	0.29	6.47
Surface	Sand	(%)	28	28	100.0	16.8	99.7	55.7	46	99	16.8	99.7	55.7	46	99
Surface	Very coarse sand	(%)	1	1	100.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Surface	Coarse sand	(%)	1	1	100.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Surface	Medium sand	(%)	1	1	100.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Surface	Fine sand	(%)	1	1	100.0	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	Very fine sand	(%)	1	1	100.0	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Surface	Fines	(%)	28	28	100.0	0.083	83.2	42.4	40.7	76.1	0.083	83.2	42.4	40.7	76.1
Surface	Silt	(%)	28	28	100.0	0.02	70	36.6	35.9	67.93	0.02	70	36.6	35.9	67.93
Surface	Coarse silt	(%)	1	1	100.0	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Surface	Medium silt	(%)	1	1	100.0	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4
Surface	Fine silt	(%)	1	1	100.0	16	16	16	16	16	16	16	16	16	16
Surface	Very fine silt	(%)	1	1	100.0	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
Surface	Clay	(%)	28	28	100.0	0.033	13.2	5.78	4.8	11.51	0.033	13.2	5.78	4.8	11.51
Surface	8-9 Phi clay	(%)	1	1	100.0	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Surface	9-10 Phi clay	(%)	1	1	100.0	4	4	4	4	4	4	4	4	4	4
Surface	>10 Phi clay	(%)	1	1	100.0	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4
Surface	Dalapon	(ug/kg)	10	0							25 U	1000 U	188	31 U	500 U
Surface	Dicamba	(ug/kg)	10	0							2.6 U	100 U	18.9	3.3 U	50 U
Surface	MCPA	(ug/kg)	10	0							130 U	50000 U	8590	170 U	25000 U
Surface	Dichloroprop	(ug/kg)	10	0							2.6 U	250 U	48.6	15 U	120 U
Surface	2,4-D	(ug/kg)	10	3	30.0	21	93	46	24	24	2.6 U	250 U	56.7	24	120 U
Surface	Silvex	(ug/kg)	10	0							2.6 U	50 U	10.4	3.3 U	25 U
Surface	2,4,5-T	(ug/kg)	10	0							2.6 U	50 U	10.4	3.3 U	25 U
Surface	2,4-DB	(ug/kg)	10	3	30.0	13	130	55.3	23	23	3.9 U	1000 U	188	23	500 U
Surface	Dinoseb	(ug/kg)	10	0							3.9 UJ	250 U	44.8	5 UJ	120 U
Surface	MCPP	(ug/kg)	10	0							130 U	50000 U	8590	170 U	25000 U
Surface	Aluminum	(mg/kg)	16	16	100.0	14000	42700	33500	38900	42700	14000	42700	33500	38900	42700
Surface	Aluminum	(mg/l)	1	1	100.0	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Surface	Antimony	(mg/kg)	14	3	21.4	6.2 J	12 J	8.57	7.5 J	7.5 J	5 UJ	12 J	6.19	5 UJ	8 UJ
Surface	Antimony	(mg/l)	1	0							0.05 U	0.05 U	0.05	0.05 U	0.05 U
Surface	Arsenic	(mg/kg)	20	7	35.0	2.2 J	9.7 J	4.83	4.2 J	5.8 J	2.2 J	10 U	5.64	5 U	9.7 J
Surface	Arsenic	(mg/l)	1	1	100.0	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Surface	Cadmium	(mg/kg)	20	16	80.0	0.081	1.7	0.423	0.4	0.6	0.081	1.7	0.454	0.4	0.88 U
Surface	Cadmium	(mg/l)	1	0							0.002 U	0.002 U	0.002	0.002 U	0.002 U
Surface	Chromium	(mg/kg)	20	20	100.0	9.5 J	50.6	30	29.6	44.6	9.5 J	50.6	30	29.6	44.6
Surface	Chromium	(mg/l)	1	0							0.005 U	0.005 U	0.005	0.005 U	0.005 U
Surface	Copper	(mg/kg)	16	16	100.0	12	57.5	38.9	39.9	53.4	12	57.5	38.9	39.9	53.4
Surface	Copper	(mg/l)	1	1	100.0	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Surface	Lead	(mg/kg)	23	23	100.0	7.3	186	28.3	20.1	27	7.3	186	28.3	20.1	27
Surface	Lead	(mg/l)	1	1	100.0	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Surface	Manganese	(mg/kg)	16	16	100.0	335	693	537	560	683	335	693	537	560	683
Surface	Manganese	(mg/l)	1	1	100.0	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
Surface	Mercury	(mg/kg)	20	17	85.0	0.01	0.36	0.0847	0.07	0.12	0.01	0.36	0.087	0.08	0.12
Surface	Mercury	(mg/l)	1	0							0.0001 U	0.0001 U	0.0001	0.0001 U	0.0001 U
Surface	Nickel	(mg/kg)	16	16	100.0	11	38.5	27.6	28.2	34	11	38.5	27.6	28.2	34
Surface	Nickel	(mg/l)	1	0							0.01 U	0.01 U	0.01	0.01 U	0.01 U
Surface	Selenium	(mg/kg)	16	13	81.3	10	16	12.7	13	15	0.36 UJ	16	10.4	12	15
Surface	Selenium	(mg/l)	1	0							0.001 U	0.001 U	0.001	0.001 U	0.001 U
Surface	Silver	(mg/kg)	16	13	81.3	0.9	1.6	1.18	1.2	1.4	0.73 UJ	1.6	1.13	1.2 UJ	1.4
Surface	Silver	(mg/l)	1	0							0.0002 U	0.0002 U	0.0002	0.0002 U	0.0002 U
Surface	Thallium	(mg/kg)	16	11	68.8	0.78	15	7.05	8	11	0.78	15	7.22	8 U	11
Surface	Thallium	(mg/l)	1	0							0.001 U	0.001 U	0.001	0.001 U	0.001 U
Surface	Zinc	(mg/kg)	20	20	100.0	50.1	422	123	105	190	50.1	422	123	105	190
Surface	Zinc	(mg/l)	1	1	100.0	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Surface	Barium	(mg/kg)	16	16	100.0	86.8	197	166	175	193	86.8	197	166	175	193
Surface	Barium	(mg/l)	1	1	100.0	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	Beryllium	(mg/kg)	16	16	100.0	0.41	0.9	0.656	0.66	0.79	0.41	0.9	0.656	0.66	0.79
Surface	Beryllium	(mg/l)	1	0							0.001 U	0.001 U	0.001	0.001 U	0.001 U
Surface	Calcium	(mg/kg)	16	16	100.0	4500	8980	7390	7600	8730	4500	8980	7390	7600	8730
Surface	Calcium	(mg/l)	1	1	100.0	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
Surface	Chromium hexavalent	(mg/kg)	2	2	100.0	0.15 G	0.17 G	0.16	0.15 G	0.15 G	0.15 G	0.17 G	0.16	0.15 G	0.15 G
Surface	Cobalt	(mg/kg)	16	16	100.0	12.1	27	18.5	17.7	26	12.1	27	18.5	17.7	26
Surface	Cobalt	(mg/l)	1	1	100.0	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Surface	Iron	(mg/kg)	16	16	100.0	35000	58600	43700	42500	51000	35000	58600	43700	42500	51000
Surface	Iron	(mg/l)	1	1	100.0	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04
Surface	Magnesium	(mg/kg)	16	16	100.0	3500	7500	6120	6750	7240	3500	7500	6120	6750	7240
Surface	Magnesium	(mg/l)	1	1	100.0	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03
Surface	Potassium	(mg/kg)	16	16	100.0	320	1600	1110	1290	1440	320	1600	1110	1290	1440
Surface	Potassium	(mg/l)	1	1	100.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Surface	Sodium	(mg/kg)	16	16	100.0	330	12700	2370	1170	5760	330	12700	2370	1170	5760
Surface	Sodium	(mg/l)	1	1	100.0	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
Surface	Titanium	(mg/kg)	2	2	100.0	1740	3200	2470	1740	1740	1740	3200	2470	1740	1740
Surface	Vanadium	(mg/kg)	16	16	100.0	87	160	106	99.6	147	87	160	106	99.6	147
Surface	Vanadium	(mg/l)	1	0							0.003 U	0.003 U	0.003	0.003 U	0.003 U
Surface	2-Methylnaphthalene	(ug/kg)	32	10	31.3	6	430	102	25	280	5 U	430	79.7	20 U	330 U
Surface	Acenaphthene	(ug/kg)	35	17	48.6	4	2400	219	46	370 J	4	2400	153	26	330 U
Surface	Acenaphthylene	(ug/kg)	35	6	17.1	5	250 J	91.8	53	140	5	330 U	66.1	19 U	330 U
Surface	Anthracene	(ug/kg)	35	17	48.6	9	550	122	60	420	5 U	550	104	41	330 U
Surface	Fluorene	(ug/kg)	35	19	54.3	7	1400	140	30	290 J	7	1400	120	27	330 U
Surface	Naphthalene	(ug/kg)	35	14	40.0	7 G	410 J	99.1	31	300	5 UG	410 J	85.5	20 U	330 U
Surface	Phenanthrene	(ug/kg)	35	25	71.4	11 J	2200	329	150	930 J	10 U	2200	276	130	930 J
Surface	Low Molecular Weight PAH	(ug/kg)	35	25	71.4	11 A	6860 A	744	241 A	2246 A	10 UA	6860 A	572	220 A	2246 A
Surface	Dibenz(a,h)anthracene	(ug/kg)	35	14	40.0	4	1700	171	34	150	4	1700	119	20 U	330 U
Surface	Benz(a)anthracene	(ug/kg)	35	27	77.1	10.5	9200	522	170	650 J	10 U	9200	444	170	650 J
Surface	Benzo(a)pyrene	(ug/kg)	35	29	82.9	12.5 J	5900	389	150	790	10 U	5900	360	150	790
Surface	Benzo(b)fluoranthene	(ug/kg)	32	27	84.4	11	11000	545	120	300	10 U	11000	501	140	330 U
Surface	Benzo(g,h,i)perylene	(ug/kg)	35	31	88.6	6.5 J	3100 G	210	76	420 J	6.5 J	3100 G	224	90	420 J
Surface	Benzo(k)fluoranthene	(ug/kg)	31	23	74.2	12.5 J	8300 G	491	110	310	10 U	8300 G	411	110	330 U
Surface	Chrysene	(ug/kg)	35	28	80.0	12.5 J	9500	577	240	860 J	10 U	9500	501	240	860 J
Surface	Fluoranthene	(ug/kg)	35	30	85.7	11.5 J	9100	643	260	1300 J	11.5 J	9100	590	290	1300 J
Surface	Indeno(1,2,3-cd)pyrene	(ug/kg)	35	30	85.7	7 J	4700 G	268	91	340	7 J	4700 G	269	95	340
Surface	Pyrene	(ug/kg)	35	29	82.9	11 J	7200	643	280 G	1400 J	10 U	7200	572	300	1400 J
Surface	Benzo(b+k)fluoranthene	(ug/kg)	34	29	85.3	11 A	19300 A	987	260 A	1100	10 UA	19300 A	881	300 A	1100
Surface	Benzo(j+k)fluoranthene	(ug/kg)	1	1	100.0	28	28	28	28	28	28	28	28	28	28
Surface	High Molecular Weight PAH	(ug/kg)	35	31	88.6	25.5 A	69700 A	4040	1540 A	6800 A	25.5 A	69700 A	3610	707 A	6800 A
Surface	Polycyclic Aromatic Hydrocarbons	(ug/kg)	35	31	88.6	25.5 A	71946 A	4640	1834 A	9360 A	25.5 A	71946 A	4150	778 A	9360 A
Surface	Anthanthrene	(ug/kg)	3	0							79 U	150 U	116	120 U	120 U
Surface	Benzo(e)pyrene	(ug/kg)	4	4	100.0	25	530	306	270	400	25	530	306	270	400
Surface	7,12-Dimethylbenz(a)anthracene	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	1-Chloronaphthalene	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	2-Naphthylamine	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	C1-Dibenzothiophene	(ug/kg)	1	1	100.0	5	5	5	5	5	5	5	5	5	5
Surface	C1-Chrysene	(ug/kg)	1	1	100.0	22	22	22	22	22	22	22	22	22	22
Surface	C1-Fluorene	(ug/kg)	1	1	100.0	3	3	3	3	3	3	3	3	3	3
Surface	C1-Naphthalene	(ug/kg)	1	1	100.0	4	4	4	4	4	4	4	4	4	4
Surface	C1-Fluoranthene/pyrene	(ug/kg)	1	1	100.0	37	37	37	37	37	37	37	37	37	37
Surface	C1-Phenanthrene/anthracene	(ug/kg)	1	1	100.0	20	20	20	20	20	20	20	20	20	20

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	C2-Dibenzothiophene	(ug/kg)	1	1	100.0	10	10	10	10	10	10	10	10	10	10
Surface	C2-Chrysene	(ug/kg)	1	1	100.0	16	16	16	16	16	16	16	16	16	16
Surface	C2-Fluorene	(ug/kg)	1	1	100.0	8	8	8	8	8	8	8	8	8	8
Surface	C2-Naphthalene	(ug/kg)	1	1	100.0	10	10	10	10	10	10	10	10	10	10
Surface	C2-Fluoranthene/pyrene	(ug/kg)	1	1	100.0	27	27	27	27	27	27	27	27	27	27
Surface	C2-Phenanthrene/anthracene	(ug/kg)	1	1	100.0	29	29	29	29	29	29	29	29	29	29
Surface	C3-Dibenzothiophene	(ug/kg)	1	1	100.0	11	11	11	11	11	11	11	11	11	11
Surface	C3-Chrysene	(ug/kg)	1	1	100.0	11	11	11	11	11	11	11	11	11	11
Surface	C3-Fluorene	(ug/kg)	1	1	100.0	20	20	20	20	20	20	20	20	20	20
Surface	C3-Naphthalene	(ug/kg)	1	1	100.0	10	10	10	10	10	10	10	10	10	10
Surface	C3-Fluoranthene/pyrene	(ug/kg)	1	1	100.0	18	18	18	18	18	18	18	18	18	18
Surface	C3-Phenanthrene/anthracene	(ug/kg)	1	1	100.0	28	28	28	28	28	28	28	28	28	28
Surface	C4-Dibenzothiophene	(ug/kg)	1	1	100.0	12	12	12	12	12	12	12	12	12	12
Surface	C4-Chrysene	(ug/kg)	1	1	100.0	4	4	4	4	4	4	4	4	4	4
Surface	C4-Naphthalene	(ug/kg)	1	1	100.0	9	9	9	9	9	9	9	9	9	9
Surface	C4-Phenanthrene/anthracene	(ug/kg)	1	1	100.0	10	10	10	10	10	10	10	10	10	10
Surface	Total benzofluoranthenes (b+k (+j))	(ug/kg)	1	1	100.0	62	62	62	62	62	62	62	62	62	62
Surface	4,4'-DDD	(ug/kg)	32	26	81.3	8.2	11000	745	100 J	2300	0.4 UJ	11000	607	100	2300
Surface	4,4'-DDE	(ug/kg)	32	18	56.3	2.4 J	1480	186	34	522	0.54 U	1480	138	50 J	509
Surface	4,4'-DDT	(ug/kg)	32	29	90.6	17	81000	4360	490	10000	16 U	81000	3960	410	10000
Surface	Total of 3 isomers: pp-DDT,-DDD,-DDE	(ug/kg)	32	31	96.9	8.2 A	84909 A	4810	580 A	12822 A	8.2 A	84909 A	4660	566 A	12822 A
Surface	Aldrin	(ug/kg)	32	0							0.4 UJ	99 U	30	10 U	97 U
Surface	alpha-Hexachlorocyclohexane	(ug/kg)	20	0							0.4 UJ	99 U	33.9	19 U	99 U
Surface	beta-Hexachlorocyclohexane	(ug/kg)	32	0							0.4 UJ	99 U	28.7	10 U	97 U
Surface	delta-Hexachlorocyclohexane	(ug/kg)	32	0							0.4 UJ	99 U	29.1	10 U	97 U
Surface	gamma-Hexachlorocyclohexane	(ug/kg)	32	0							0.4 UJ	99 U	28.7	10 U	97 U
Surface	cis-Chlordane	(ug/kg)	28	0							0.45 U	110 U	34.2	19 U	99 U
Surface	Dieldrin	(ug/kg)	32	0							0.4 UJ	235 U	60.9	19 U	200 U
Surface	alpha-Endosulfan	(ug/kg)	32	0							0.4 UJ	99 U	28.7	10 U	97 U
Surface	beta-Endosulfan	(ug/kg)	32	0							0.4 UJ	200 U	49.9	19 U	190 U
Surface	Endosulfan sulfate	(ug/kg)	32	1	3.1	240	240	240	240	240	0.4 UJ	240	56.2	19 U	200 U
Surface	Endrin	(ug/kg)	32	0							0.4 UJ	200 U	49.9	19 U	190 U
Surface	Endrin aldehyde	(ug/kg)	32	2	6.3	0.56 J	215	108	0.56 J	0.56 J	0.56 J	215	54	19 U	200 U
Surface	Endrin ketone	(ug/kg)	32	0							0.45 U	200 U	49.9	19 U	190 U
Surface	Heptachlor	(ug/kg)	32	0							0.4 UJ	99 U	28.7	10 U	97 U
Surface	Heptachlor epoxide	(ug/kg)	32	0							0.4 UJ	360 U	39.7	10 U	99 U
Surface	Methoxychlor	(ug/kg)	32	0							0.8 UJ	990 U	223	80 U	970 U
Surface	Toxaphene	(ug/kg)	32	0							17 UJ	9900 U	2740	960 U	9700 U
Surface	Azinphosmethyl	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Bromoxynil	(ug/kg)	4	0							25 U	250 U	105	25 U	120 U
Surface	gamma-Chlordane	(ug/kg)	28	0							0.45 U	99 U	31.7	19 U	97 U
Surface	Chlordane (cis & trans)	(ug/kg)	4	0							80 U	80 U	80	80 U	80 U
Surface	Chlorpyrifos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Coumaphos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Demeton	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Diazinon	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Dichlorvos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Diphenyl	(ug/kg)	1	1	100.0	2	2	2	2	2	2	2	2	2	2
Surface	Disulfoton	(ug/kg)	4	1	25.0	56	56	56	56	56	50 U	56	51.5	50 U	50 U
Surface	Ethoprop	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Fensulfothion	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	Fenthion	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Hexachlorocyclohexanes	(ug/kg)	12	0							10 U	40 U	20	10 U	40 U
Surface	Malathion	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Merphos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Methyl parathion	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Mevinphos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Naled	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Perthane	(ug/kg)	4	0							100 U	100 U	100	100 U	100 U
Surface	Phorate	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Prothiophos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Ronnel	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Stirofos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Sulprofos	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Tetraethyl pyrophosphate	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Trichloronate	(ug/kg)	4	0							50 U	50 U	50	50 U	50 U
Surface	Diesel fuels	(mg/kg)	2	1	50.0	50 G	50 G	50	50 G	50 G	50 U	50 G	50	50 U	50 U
Surface	Heavy oil	(mg/kg)	1	1	100.0	96	96	96	96	96	96	96	96	96	96
Surface	Lube Oil	(mg/kg)	2	0							100 U	100 U	100	100 U	100 U
Surface	Natural gasoline	(mg/kg)	2	0							20 U	20 U	20	20 U	20 U
Surface	2,3,4,6-Tetrachlorophenol	(ug/kg)	7	0							79 UJ	1600 U	964	1600 U	1600 U
Surface	2,4,5-Trichlorophenol	(ug/kg)	32	0							40 U	330 U	118	96 U	330 U
Surface	2,4,6-Trichlorophenol	(ug/kg)	32	0							30 U	150 U	69.9	79 U	120 U
Surface	2,4-Dichlorophenol	(ug/kg)	32	0							23 U	300 U	87.3	60 U	160 U
Surface	2,4-Dimethylphenol	(ug/kg)	32	0							19 U	200 U	93.8	26 U	200 U
Surface	2,4-Dinitrophenol	(ug/kg)	23	0							23 U	300 UG	185	190 UJ	300 UJ
Surface	2-Chlorophenol	(ug/kg)	32	0							19 U	150 U	41.8	26 U	79 U
Surface	2-Methylphenol	(ug/kg)	28	0							19 U	590 U	102	100 U	320 U
Surface	2-Nitrophenol	(ug/kg)	20	0							23 U	150 U	87.6	97 U	120 U
Surface	4,6-Dinitro-2-methylphenol	(ug/kg)	32	0							45 U	590 U	168	120 U	320 U
Surface	4-Chloro-3-methylphenol	(ug/kg)	32	0							23 U	300 U	60.7	40 U	160 U
Surface	4-Methylphenol	(ug/kg)	16	12	75.0	42	580	289	260	570	19 U	580	250	200	570
Surface	4-Nitrophenol	(ug/kg)	29	0							45 U	300 U	111	100 UG	240 U
Surface	Pentachlorophenol	(ug/kg)	24	1	4.2	680	680	680	680	680	45 U	680	159	98 U	300 UG
Surface	Phenol	(ug/kg)	32	0							19 U	300 U	52.8	26 U	160 U
Surface	2,3,4,5-Tetrachlorophenol	(ug/kg)	3	0							79 UJ	150 U	116	120 U	120 U
Surface	2,4-Dichloro-6-methylphenol	(ug/kg)	4	0							200 U	570 U	300	200 U	230 U
Surface	2,6-Dichlorophenol	(ug/kg)	7	0							130 U	370 U	211	160 U	300 U
Surface	3- and 4-Methylphenol Coelution	(ug/kg)	6	0							200 U	200 U	200	200 UJ	200 UJ
Surface	4-Chloro-o-cresol	(ug/kg)	4	0							81 U	230 U	121	82 U	92 U
Surface	4-Chlorophenol	(ug/kg)	4	0							330 U	910 U	485	330 U	370 U
Surface	Cresol	(ug/kg)	4	0							41 U	110 U	59.5	41 U	46 U
Surface	Dimethyl phthalate	(ug/kg)	32	1	3.1	25	25	25	25	25	10 U	330 U	55.6	19 U	330 U
Surface	Diethyl phthalate	(ug/kg)	32	0							10 U	330 U	55.1	19 U	330 U
Surface	Dibutyl phthalate	(ug/kg)	32	8	25.0	12	640	135	39	180	10 UG	640	85.2	20 U	330 U
Surface	Butylbenzyl phthalate	(ug/kg)	32	2	6.3	15	17 G	16	15	15	10 U	330 U	55.5	19 U	330 U
Surface	Di-n-octyl phthalate	(ug/kg)	32	0							10 UG	330 U	55.1	19 U	330 U
Surface	Bis(2-ethylhexyl) phthalate	(ug/kg)	32	22	68.8	21	1800	404	260	1000	20 UG	1800	328	250	1000
Surface	1,2-Diphenylhydrazine	(ug/kg)	4	0							1600 U	1600 U	1600	1600 U	1600 U
Surface	Bis(2-chloro-1-methylethyl) ether	(ug/kg)	29	0							10 U	330 U	58.4	19 UJ	330 U
Surface	2,4-Dinitrotoluene	(ug/kg)	32	0							20 U	330 U	110	96 U	330 U
Surface	2,6-Dinitrotoluene	(ug/kg)	32	0							10 U	330 U	95.5	96 U	330 U

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	2-Chloronaphthalene	(ug/kg)	32	0							5 U	330 U	53.2	19 U	330 U
Surface	2-Nitroaniline	(ug/kg)	32	0							10 U	3000 U	462	96 UJ	1600 U
Surface	3,3'-Dichlorobenzidine	(ug/kg)	32	0							40 UG	660 U	164	96 U	660 U
Surface	3-Nitroaniline	(ug/kg)	32	0							110 UJ	3000 U	542	200 UG	1600 U
Surface	4-Bromophenyl phenyl ether	(ug/kg)	32	0							10 U	330 U	63.8	19 U	330 U
Surface	4-Chloroaniline	(ug/kg)	32	0							50 U	590 U	127	58 U	330 U
Surface	4-Chlorophenyl phenyl ether	(ug/kg)	32	0							10 U	330 U	57.3	19 U	330 U
Surface	4-Nitroaniline	(ug/kg)	32	0							10 U	3000 U	462	96 U	1600 U
Surface	Aniline	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Benzoic acid	(ug/kg)	29	1	3.4	1200	1200	1200	1200	1200	190 UJ	1200 U	320	250 U	790 U
Surface	Benzyl alcohol	(ug/kg)	32	0							19 UJ	330 U	89.8	50 UG	330 U
Surface	Bis(2-chloroethoxy) methane	(ug/kg)	32	0							10 U	330 U	55.1	19 U	330 U
Surface	Bis(2-chloroethyl) ether	(ug/kg)	32	0							10 U	330 U	65.2	38 U	330 U
Surface	Carbazole	(ug/kg)	28	8	28.6	13	700 J	147	40 J	260	10 UG	700 J	54.5	19 U	59
Surface	Dibenzofuran	(ug/kg)	33	12	36.4	4	170 J	69.9	47	160	4	330 U	72	20 U	330 U
Surface	Hexachlorobenzene	(ug/kg)	28	2	7.1	19 J	340	180	19 J	19 J	10 U	340	30	19 U	48 U
Surface	Hexachlorobutadiene	(ug/kg)	32	2	6.3	200	270	235	200	200	10 U	330 U	77.6	19 U	330 U
Surface	Hexachlorocyclopentadiene	(ug/kg)	20	0							94 U	330 U	159	99 U	330 U
Surface	Hexachloroethane	(ug/kg)	32	3	9.4	38	1600	562	49	49	19 U	1600	136	40 UG	330 U
Surface	Isophorone	(ug/kg)	32	0							10 U	330 U	55.1	19 U	330 U
Surface	Nitrobenzene	(ug/kg)	32	0							10 U	330 U	63.8	19 U	330 U
Surface	N-Nitrosodimethylamine	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	N-Nitrosodipropylamine	(ug/kg)	32	0							10 U	330 U	82.7	38 U	330 U
Surface	N-Nitrosodiphenylamine	(ug/kg)	32	0							10 U	330 U	57.4	19 U	330 U
Surface	1-Naphthylamine	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	2-Picoline	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	3-Methylcholanthrene	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	4-Aminobiphenyl	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Acetophenone	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	alpha,alpha-Dimethylphenethylamine	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Benzidine	(ug/kg)	4	0							1600 U	1600 U	1600	1600 U	1600 U
Surface	Bis(2-chloroisopropyl) ether	(ug/kg)	3	0							320 UJ	590 U	463	480 U	480 U
Surface	Dibenzothiophene	(ug/kg)	1	1	100.0	4	4	4	4	4	4	4	4	4	4
Surface	Diphenylamine	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Ethyl methanesulfonate	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Methyl methanesulfonate	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	N-Nitrosodibutylamine	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	N-Nitrosopiperidine	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	p-Dimethylaminoazobenzene	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Pentachloronitrobenzene	(ug/kg)	4	0							1600 U	1600 U	1600	1600 U	1600 U
Surface	Perylene	(ug/kg)	1	1	100.0	24	24	24	24	24	24	24	24	24	24
Surface	Phenacetin	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Pronamide	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	1,1,1,2-Tetrachloroethane	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	1,1,1-Trichloroethane	(ug/kg)	16	0							1 U	11 U	5.75	5 U	10 U
Surface	1,1,2,2-Tetrachloroethane	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U
Surface	1,1,2-Trichloroethane	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U
Surface	1,1-Dichloroethane	(ug/kg)	16	0							1 U	11 U	5.75	5 U	10 U
Surface	Vinylidene chloride	(ug/kg)	16	0							1 U	11 U	5.75	5 U	10 U
Surface	1,2,3-Trichloropropane	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	1,2-Dichloroethane	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	1,2-Dichloropropane	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U
Surface	2-Chloroethyl vinyl ether	(ug/kg)	4	0							10 U	10 U	10	10 U	10 U
Surface	Methyl N-butyl ketone	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	Benzene	(ug/kg)	18	2	11.1	1.3	1.4	1.35	1.3	1.3	1 U	300 U	38.5	5 U	300 U
Surface	Bromochloromethane	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	Bromodichloromethane	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U
Surface	Bromoform	(ug/kg)	16	0							5 U	11 U	8	9 U	10 U
Surface	Bromomethane	(ug/kg)	16	0							5 UJ	11 U	8	9 UG	10 U
Surface	Carbon disulfide	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	Carbon tetrachloride	(ug/kg)	16	0							1 U	11 U	5.75	5 U	10 U
Surface	Chlorodibromomethane	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U
Surface	Chloroethane	(ug/kg)	16	0							5 U	11 U	8	9 U	10 U
Surface	Chloroform	(ug/kg)	16	0							1 U	11 U	5.75	5 U	10 U
Surface	Chloromethane	(ug/kg)	16	0							5 UJ	11 U	8	9 UG	10 U
Surface	cis-1,3-Dichloropropene	(ug/kg)	16	0							4 U	11 U	6.5	5 U	10 U
Surface	Methylene bromide	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	Dichlorodifluoromethane	(ug/kg)	16	0							5 UJ	20 U	10.5	9 UG	20 U
Surface	Ethylbenzene	(ug/kg)	18	0							1 U	300 U	38.4	5 U	300 U
Surface	Isopropylbenzene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	m,p-Xylene	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	Methylene chloride	(ug/kg)	16	0							10 U	22 U	13.6	10 U	21 U
Surface	o-Xylene	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	Styrene	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	Tetrachloroethene	(ug/kg)	16	0							1 U	11 U	5.75	5 U	10 U
Surface	Toluene	(ug/kg)	18	0							1 U	300 U	38.4	5 U	300 U
Surface	trans-1,2-Dichloroethene	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	trans-1,3-Dichloropropene	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U
Surface	Trichloroethene	(ug/kg)	16	0							1 U	11 U	5.75	5 U	10 U
Surface	Trichlorofluoromethane	(ug/kg)	16	0							5 UJ	20 U	10.5	9 UG	20 U
Surface	Vinyl chloride	(ug/kg)	16	0							2 U	11 U	6	5 U	10 U
Surface	1,1,2-Trichloro-1,2,2-trifluoroethane	(ug/kg)	4	0							10 U	10 U	10	10 U	10 U
Surface	1,1-Dichloropropene	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	1,2-Dibromo-3-chloropropane	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	1,3,5-Trimethylbenzene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	1,3-Dichloropropane	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	2,2-Dichloropropane	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	2-Chlorotoluene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	4-Chlorotoluene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	Bromobenzene	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	cis-1,2-Dichloroethene	(ug/kg)	12	0							5 U	11 U	7.33	5 U	10 U
Surface	Ethylene dibromide	(ug/kg)	16	0							4 U	44 U	23.1	20 U	42 U
Surface	n-Butylbenzene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	n-Propylbenzene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	Pseudocumene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	Sec-butylbenzene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 UJ
Surface	tert-Butylbenzene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	1,2-Dichloroethene	(ug/kg)	4	0							1 U	1 U	1	1 U	1 U
Surface	Cymene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	Xylene	(ug/kg)	6	0							2 U	300 U	101	2 U	300 U
Surface	Chlorobenzene	(ug/kg)	16	5	31.3	4.6	34000	6880	130	250	1 U	34000	2150	5 U	250
Surface	1,2-Dichlorobenzene	(ug/kg)	32	3	9.4	4.8	1700 J	576	22	22	2 U	1700 J	67.6	11 UG	48 UJ

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Surface	1,3-Dichlorobenzene	(ug/kg)	32	0							2 U	59 UJ	15.3	11 UG	32 UJ
Surface	1,4-Dichlorobenzene	(ug/kg)	32	2	6.3	4.8	530	267	4.8	4.8	2 U	530	30.9	11 UG	48 UJ
Surface	1,2,3-Trichlorobenzene	(ug/kg)	12	0							20 U	44 U	29.5	20 U	42 U
Surface	1,2,4-Trichlorobenzene	(ug/kg)	32	2	6.3	10	190	100	10	10	10 U	330 U	69.4	19 U	330 U
Surface	1,2,4,5-Tetrachlorobenzene	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Surface	Pentachlorobenzene	(ug/kg)	4	0							330 U	330 U	330	330 U	330 U
Subsurface	Aroclor 1016	(ug/kg)	5	0							80 UG	75000 U	16900	1600 U	7500 U
Subsurface	Aroclor 1242	(ug/kg)	5	0							80 UG	75000 U	16900	1600 U	7500 U
Subsurface	Aroclor 1248	(ug/kg)	5	0							80 UG	75000 U	16900	1600 U	7500 U
Subsurface	Aroclor 1254	(ug/kg)	5	0							80 UG	75000 U	16900	1600 U	7500 U
Subsurface	Aroclor 1260	(ug/kg)	5	0							80 UG	75000 U	16900	1600 U	7500 U
Subsurface	Aroclor 1221	(ug/kg)	3	0							3100 U	150000 U	56000	15000 U	15000 U
Subsurface	Aroclor 1232	(ug/kg)	3	0							1600 U	75000 U	28000	7500 U	7500 U
Subsurface	Polychlorinated biphenyl	(ug/kg)	5	0							80 UA	150000 UA	33700	3100 UA	15000 UA
Subsurface	Butyltin ion	(ug/kg)	1	0							14 U	14 U	14	14 U	14 U
Subsurface	Dibutyltin ion	(ug/kg)	1	0							14 U	14 U	14	14 U	14 U
Subsurface	Tributyltin ion	(ug/kg)	1	0							14 U	14 U	14	14 U	14 U
Subsurface	Tetrabutyltin	(ug/kg)	1	0							14 U	14 U	14	14 U	14 U
Subsurface	Total solids	(%)	40	40	100.0	46.4	80.9	63.6	64.5	78.4	46.4	80.9	63.6	64.5	78.4
Subsurface	Total organic carbon	(%)	22	20	90.9	0.08	2.8	1.48	1.4	2.7	0.05 U	2.8	1.35	1.4	2.42
Subsurface	Total volatile solids	(%)	3	3	100.0	7.2	8.2	7.67	7.6	7.6	7.2	8.2	7.67	7.6	7.6
Subsurface	Bromine	(ug/kg)	1	1	100.0	13	13	13	13	13	13	13	13	13	13
Subsurface	Chlorine	(ug/kg)	1	1	100.0	2380	2380	2380	2380	2380	2380	2380	2380	2380	2380
Subsurface	2,3,7,8-Tetrachlorodibenzo-p-dioxin	(ng/kg)	3	1	33.3	0.63	0.63	0.63	0.63	0.63	0.63	6.9 U	2.76	0.76 U	0.76 U
Subsurface	Tetrachlorodibenzo-p-dioxin	(ng/kg)	1	1	100.0	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Subsurface	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	(ng/kg)	3	1	33.3	1.2	1.2	1.2	1.2	1.2	1.2	6.9 U	3.23	1.6 U	1.6 U
Subsurface	Pentachlorodibenzo-p-dioxin	(ng/kg)	2	1	50.0	1.2	1.2	1.2	1.2	1.2	1.2	1.6 U	1.4	1.2	1.2
Subsurface	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	(ng/kg)	3	1	33.3	1.2	1.2	1.2	1.2	1.2	1.2	11 U	4.47	1.2 U	1.2 U
Subsurface	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	(ng/kg)	3	2	66.7	17	22	19.5	17	17	3.1 U	22	14	17	17
Subsurface	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	(ng/kg)	3	2	66.7	8.6	13	10.8	8.6	8.6	1.4 U	13	7.67	8.6	8.6
Subsurface	Hexachlorodibenzo-p-dioxin	(ng/kg)	1	1	100.0	130	130	130	130	130	130	130	130	130	130
Subsurface	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	(ng/kg)	3	3	100.0	29	290	176	210	210	29	290	176	210	210
Subsurface	Heptachlorodibenzo-p-dioxin	(ng/kg)	1	1	100.0	630	630	630	630	630	630	630	630	630	630
Subsurface	Octachlorodibenzo-p-dioxin	(ng/kg)	3	3	100.0	180	2700	1660	2100	2100	180	2700	1660	2100	2100
Subsurface	2,3,7,8-Tetrachlorodibenzofuran	(ng/kg)	3	3	100.0	84	15000	5060	110	110	84	15000	5060	110	110
Subsurface	Tetrachlorodibenzofuran	(ng/kg)	1	1	100.0	270	270	270	270	270	270	270	270	270	270
Subsurface	1,2,3,7,8-Pentachlorodibenzofuran	(ng/kg)	3	2	66.7	49	360	205	49	49	49	18000 U	6140	360	360
Subsurface	2,3,4,7,8-Pentachlorodibenzofuran	(ng/kg)	3	3	100.0	57	11000	3710	61	61	57	11000	3710	61	61
Subsurface	Pentachlorodibenzofuran	(ng/kg)	2	2	100.0	150	680	415	150	150	150	680	415	150	150
Subsurface	1,2,3,4,7,8-Hexachlorodibenzofuran	(ng/kg)	3	3	100.0	110 J	22000 J	7600	700	700	110 J	22000 J	7600	700	700
Subsurface	1,2,3,6,7,8-Hexachlorodibenzofuran	(ng/kg)	3	2	66.7	26 J	150	88	26 J	26 J	26 J	5600 UJ	1930	150	150
Subsurface	1,2,3,7,8,9-Hexachlorodibenzofuran	(ng/kg)	3	3	100.0	22	2700	916	25	25	22	2700	916	25	25
Subsurface	2,3,4,6,7,8-Hexachlorodibenzofuran	(ng/kg)	3	3	100.0	10	1300	443	18	18	10	1300	443	18	18
Subsurface	Hexachlorodibenzofuran	(ng/kg)	2	2	100.0	210	1200	705	210	210	210	1200	705	210	210
Subsurface	1,2,3,4,6,7,8-Heptachlorodibenzofuran	(ng/kg)	3	3	100.0	34	5400	1900	270	270	34	5400	1900	270	270
Subsurface	1,2,3,4,7,8,9-Heptachlorodibenzofuran	(ng/kg)	3	3	100.0	20	2200	790	150	150	20	2200	790	150	150
Subsurface	Heptachlorodibenzofuran	(ng/kg)	1	1	100.0	650	650	650	650	650	650	650	650	650	650
Subsurface	Octachlorodibenzofuran	(ng/kg)	3	3	100.0	82	4900	1840	530	530	82	4900	1840	530	530
Subsurface	Gravel	(%)	16	14	87.5	0.1	14.9	2.59	0.49	5.3	0.1	14.9	2.45	0.49	5.3
Subsurface	Sand	(%)	19	17	89.5	11.7	94.5	41.2	27.79	83.4	11.7	99.6 U	47.2	30.1	96.8 U
Subsurface	Fines	(%)	19	19	100.0	0.13	88.3	50.8	66.3	84.6	0.13	88.3	50.8	66.3	84.6

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Subsurface	Silt	(%)	19	17	89.5	0.12	77.3	47.9	57.4	73.1	0.08 U	77.3	42.9	53.73	73.1
Subsurface	Clay	(%)	19	17	89.5	0.12	17.34	8.77	8.9	15.2	0.05 U	17.34	7.86	6.9	15.2
Subsurface	Mean grain size	(mm)	3	3	100.0	0.03	0.04	0.0337	0.0312	0.0312	0.03	0.04	0.0337	0.0312	0.0312
Subsurface	Median grain size	(mm)	3	3	100.0	0.018	0.021	0.0197	0.02	0.02	0.018	0.021	0.0197	0.02	0.02
Subsurface	Aluminum	(mg/kg)	4	4	100.0	34100	39100	36800	36500	37500	34100	39100	36800	36500	37500
Subsurface	Antimony	(mg/kg)	4	0							4 UJ	5 UJ	4.75	5 UJ	5 UJ
Subsurface	Arsenic	(mg/kg)	6	2	33.3	3.5 G	5.1 G	4.3	3.5 G	3.5 G	3.5 G	5.1 G	4.6	5 U	5 U
Subsurface	Cadmium	(mg/kg)	6	6	100.0	0.36 G	0.8	0.558	0.4	0.7	0.36 G	0.8	0.558	0.4	0.7
Subsurface	Chromium	(mg/kg)	6	6	100.0	24 G	43.3	34.9	33	42.9	24 G	43.3	34.9	33	42.9
Subsurface	Copper	(mg/kg)	6	6	100.0	37.1	57.4	50.2	51.2	53.6	37.1	57.4	50.2	51.2	53.6
Subsurface	Lead	(mg/kg)	8	8	100.0	2.6	44	26.7	31	43	2.6	44	26.7	31	43
Subsurface	Manganese	(mg/kg)	6	6	100.0	435	676 G	532	475 G	663	435	676 G	532	475 G	663
Subsurface	Mercury	(mg/kg)	6	6	100.0	0.077 G	0.28	0.17	0.14 G	0.23	0.077 G	0.28	0.17	0.14 G	0.23
Subsurface	Nickel	(mg/kg)	6	6	100.0	27.9	60.7	38.7	31.4	42 G	27.9	60.7	38.7	31.4	42 G
Subsurface	Selenium	(mg/kg)	4	4	100.0	6	12	9.5	9	11	6	12	9.5	9	11
Subsurface	Silver	(mg/kg)	4	4	100.0	0.7	1.5	1.1	1.1	1.1	0.7	1.5	1.1	1.1	1.1
Subsurface	Thallium	(mg/kg)	4	1	25.0	12	12	12	12	12	4 U	12	6.5	5 U	5 U
Subsurface	Zinc	(mg/kg)	6	6	100.0	137 G	243	172	159 G	181	137 G	243	172	159 G	181
Subsurface	Barium	(mg/kg)	4	4	100.0	192	330	252	205	281	192	330	252	205	281
Subsurface	Beryllium	(mg/kg)	4	4	100.0	0.47	0.55	0.515	0.5	0.54	0.47	0.55	0.515	0.5	0.54
Subsurface	Calcium	(mg/kg)	4	4	100.0	7440	13800	9310	7560	8450	7440	13800	9310	7560	8450
Subsurface	Cobalt	(mg/kg)	4	4	100.0	16.2	17.8	16.9	16.7	16.9	16.2	17.8	16.9	16.7	16.9
Subsurface	Iron	(mg/kg)	6	6	100.0	33200 G	40000	38000	38200	39900	33200 G	40000	38000	38200	39900
Subsurface	Magnesium	(mg/kg)	4	4	100.0	6540	7370	6860	6740	6770	6540	7370	6860	6740	6770
Subsurface	Potassium	(mg/kg)	4	4	100.0	1140	1280	1210	1200	1200	1140	1280	1210	1200	1200
Subsurface	Sodium	(mg/kg)	4	4	100.0	1230 J	4480 J	2450	1910 J	2180 J	1230 J	4480 J	2450	1910 J	2180 J
Subsurface	Titanium	(mg/kg)	1	1	100.0	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Subsurface	Vanadium	(mg/kg)	4	4	100.0	99.7	107	102	99.8	101	99.7	107	102	99.8	101
Subsurface	2-Methylnaphthalene	(ug/kg)	16	11	68.8	8 J	610	122	20	250	5 U	610	85.4	15	250
Subsurface	Acenaphthene	(ug/kg)	20	13	65.0	12.5 J	820	163	71	290	10 U	820	125	50 U	290
Subsurface	Acenaphthylene	(ug/kg)	20	10	50.0	11	60	33.2	22.5 J	49	10 U	150 UG	37.6	20	150 UG
Subsurface	Anthracene	(ug/kg)	20	14	70.0	11 J	870	195	100	550	5 U	870	187	82	550
Subsurface	Fluorene	(ug/kg)	20	12	60.0	10.5 J	620	193	55	600	10 U	620	143	50 U	600
Subsurface	Naphthalene	(ug/kg)	22	12	54.5	9	1100	192	35	590	5 U	1100	121	35	240
Subsurface	Phenanthrene	(ug/kg)	20	14	70.0	97 J	15000	2540	260	13000	10 U	15000	1820	210	13000
Subsurface	Low Molecular Weight PAH	(ug/kg)	20	14	70.0	131 A	16780 A	3240	415 A	15288 A	10 UA	16780 A	2320	392 A	15288 A
Subsurface	Dibenz(a,h)anthracene	(ug/kg)	20	14	70.0	6 J	1800 G	251	63	990	5 U	1800 G	244	50 U	990
Subsurface	Benz(a)anthracene	(ug/kg)	20	16	80.0	14.5 J	13000	1200	330	1800	10 U	13000	1010	330	1800
Subsurface	Benzo(a)pyrene	(ug/kg)	20	16	80.0	13 J	9600	932	230	950	10 U	9600	817	230	950
Subsurface	Benzo(b)fluoranthene	(ug/kg)	18	17	94.4	14.5	9700	1180	230	5600	10 U	9700	1120	200	5600
Subsurface	Benzo(g,h,i)perylene	(ug/kg)	20	18	90.0	7 J	4300	556	140	1800	7 J	4300	641	200	1800
Subsurface	Benzo(k)fluoranthene	(ug/kg)	18	17	94.4	11 J	16000	1320	170	3000	10 U	16000	1250	150	3000
Subsurface	Chrysene	(ug/kg)	20	18	90.0	12 J	16000	1670	340	7100	10 U	16000	1530	340	7100
Subsurface	Fluoranthene	(ug/kg)	20	17	85.0	13.5 J	23000	2590	440	10000	10 U	23000	2280	440	10000
Subsurface	Indeno(1,2,3-cd)pyrene	(ug/kg)	20	18	90.0	7 J	7000	660	200	1400	7 J	7000	659	205 J	1400
Subsurface	Pyrene	(ug/kg)	20	17	85.0	13 J	18000	2160	590	6000	10 U	18000	1930	590	6000
Subsurface	Benzo(b+k)fluoranthene	(ug/kg)	20	19	95.0	27.5 A	25700 A	2370	610 G	8600 A	10 UA	25700 A	2250	400 A	8600 A
Subsurface	High Molecular Weight PAH	(ug/kg)	20	20	100.0	14 A	118400 A	10800	1982 A	38200 A	14 A	118400 A	10800	1982 A	38200 A
Subsurface	Polycyclic Aromatic Hydrocarbons	(ug/kg)	20	20	100.0	14 A	135180 A	13000	2281 A	53488 A	14 A	135180 A	13000	2281 A	53488 A
Subsurface	4,4'-DDD	(ug/kg)	55	48	87.3	10	690000	47100	310	240000	6.2 U	690000	41100	220	240000
Subsurface	4,4'-DDE	(ug/kg)	55	26	47.3	8.1	24000	2110	310	9000	5.4 UI	24000	1340	92 U	7500 U

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Subsurface	4,4'-DDT	(ug/kg)	218	83	38.1	11	4500000	148000	27000	200000	6.2 U	4500000	85700	50000 U	110000
Subsurface	Total of 3 isomers: pp-DDT,-DDD,-DDE	(ug/kg)	55	52	94.5	8.1 A	4764000 A	223000	1900 A	800000 A	6.2 UA	4764000 A	211000	1270 A	800000 A
Subsurface	Aldrin	(ug/kg)	55	0							0.96 U	3800 U	247	11 UJ	1800 U
Subsurface	alpha-Hexachlorocyclohexane	(ug/kg)	43	1	2.3	120	120	120	120	120	0.96 U	3800 U	229	70 U	380 U
Subsurface	beta-Hexachlorocyclohexane	(ug/kg)	55	2	3.6	77	120	98.5	77	77	0.96 U	3800 U	182	11 UJ	400 U
Subsurface	delta-Hexachlorocyclohexane	(ug/kg)	55	0							0.96 U	3800 UJ	181	11 UJ	400 U
Subsurface	gamma-Hexachlorocyclohexane	(ug/kg)	55	1	1.8	45.9	45.9	45.9	45.9	45.9	0.96 U	3800 U	182	11 UJ	400 U
Subsurface	cis-Chlordane	(ug/kg)	53	0							0.96 U	3800 UJ	189	11 UJ	400 U
Subsurface	trans-Chlordane	(ug/kg)	37	3	8.1	140 J	410 J	240	170 J	170 J	6.2 U	1800 U	173	11 UJ	440 U
Subsurface	Dieldrin	(ug/kg)	55	0							1.9 U	7500 U	257	11 UJ	750 U
Subsurface	alpha-Endosulfan	(ug/kg)	55	0							0.96 U	3800 U	185	12 UG	400 U
Subsurface	beta-Endosulfan	(ug/kg)	55	0							1.9 U	38000 U	922	11 UJ	750 U
Subsurface	Endosulfan sulfate	(ug/kg)	55	1	1.8	290	290	290	290	290	1.9 U	7500 UJ	260	11 UJ	750 UJ
Subsurface	Endrin	(ug/kg)	55	1	1.8	190 J	190 J	190	190 J	190 J	1.9 U	22000 U	634	11 UJ	750 U
Subsurface	Endrin aldehyde	(ug/kg)	53	0							1.9 U	7500 U	266	11 UJ	750 U
Subsurface	Endrin ketone	(ug/kg)	55	1	1.8	120	120	120	120	120	1.9 U	7500 UJ	257	11 UJ	750 UJ
Subsurface	Heptachlor	(ug/kg)	55	0							0.96 U	3800 U	181	11 UJ	400 U
Subsurface	Heptachlor epoxide	(ug/kg)	55	2	3.6	89	110	99.5	89	89	0.96 U	3800 U	182	11 UJ	400 U
Subsurface	Methoxychlor	(ug/kg)	55	0							6.2 U	38000 U	879	20 U	1400 U
Subsurface	Toxaphene	(ug/kg)	55	0							96 U	380000 U	15800	710 U	50000 U
Subsurface	gamma-Chlordane	(ug/kg)	16	0							0.96 U	3800 U	305	10 U	400 U
Subsurface	Chlordane (cis & trans)	(ug/kg)	2	0							40 UG	40 UG	40	40 UG	40 UG
Subsurface	Hexachlorocyclohexanes	(ug/kg)	12	0							10 U	400 U	51.3	10 U	40 U
Subsurface	Diesel fuels	(mg/kg)	1	0							50 U	50 U	50	50 U	50 U
Subsurface	Lube Oil	(mg/kg)	1	0							100 U	100 U	100	100 U	100 U
Subsurface	Natural gasoline	(mg/kg)	1	0							20 U	20 U	20	20 U	20 U
Subsurface	2,4,5-Trichlorophenol	(ug/kg)	16	1	6.3	73	73	73	73	73	40 U	230 U	69.3	40 U	170 U
Subsurface	2,4,6-Trichlorophenol	(ug/kg)	17	1	5.9	57	57	57	57	57	30 U	230 U	69.6	30 U	200 UG
Subsurface	2,4-Dichlorophenol	(ug/kg)	17	1	5.9	140	140	140	140	140	58 U	200 UG	106	100 U	140 U
Subsurface	2,4-Dimethylphenol	(ug/kg)	17	0							19 U	200 U	154	200 UJ	200 U
Subsurface	2,4-Dinitrophenol	(ug/kg)	9	2	22.2	18 J	12000 G	6010	18 J	18 J	18 J	12000 G	1570	300 UG	470 UJ
Subsurface	2-Chlorophenol	(ug/kg)	17	2	11.8	51	93	72	51	51	19 U	93	49.3	50 U	70 UG
Subsurface	2-Methylphenol	(ug/kg)	16	0							19 U	100 U	82.6	100 U	100 U
Subsurface	2-Nitrophenol	(ug/kg)	4	0							97 U	230 U	149	99 U	170 U
Subsurface	4,6-Dinitro-2-methylphenol	(ug/kg)	17	1	5.9	2700 G	2700 G	2700	2700 G	2700 G	100 U	2700 G	301	100 U	470 U
Subsurface	4-Chloro-3-methylphenol	(ug/kg)	17	0							39 U	93 U	54.2	50 U	80 UG
Subsurface	4-Methylphenol	(ug/kg)	4	4	100.0	100	250	153	130	130	100	250	153	130	130
Subsurface	4-Nitrophenol	(ug/kg)	15	0							97 U	400 UG	133	100 U	230 U
Subsurface	Pentachlorophenol	(ug/kg)	9	1	11.1	600 G	600 G	600	600 G	600 G	97 U	600 G	266	300 U	300 U
Subsurface	Phenol	(ug/kg)	17	1	5.9	300	300	300	300	300	19 U	300	60.8	50 UG	60 UG
Subsurface	3- and 4-Methylphenol Coelution	(ug/kg)	6	0							200 U	200 U	200	200 U	200 U
Subsurface	Dimethyl phthalate	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	Diethyl phthalate	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	Dibutyl phthalate	(ug/kg)	16	3	18.8	12 G	1500	511	20	20	10 U	1500	109	10 U	47 U
Subsurface	Butylbenzyl phthalate	(ug/kg)	16	3	18.8	10	42	21.7	13	13	10	47 U	17.3	10 U	42
Subsurface	Di-n-octyl phthalate	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	Bis(2-ethylhexyl) phthalate	(ug/kg)	16	11	68.8	140	4200	835	410 J	1300	20 U	4200	595	280 J	1300
Subsurface	Bis(2-chloro-1-methylethyl) ether	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	2,4-Dinitrotoluene	(ug/kg)	16	0							20 U	230 U	52.3	20 U	170 U
Subsurface	2,6-Dinitrotoluene	(ug/kg)	16	0							10 U	230 U	44.8	10 U	170 U
Subsurface	2-Chloronaphthalene	(ug/kg)	16	0							5 U	47 U	11.3	5 U	35 U

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Subsurface	2-Nitroaniline	(ug/kg)	16	0							10 U	230 U	44.8	10 U	170 U
Subsurface	3,3'-Dichlorobenzidine	(ug/kg)	16	0							40 U	230 U	67.3	40 U	170 U
Subsurface	3-Nitroaniline	(ug/kg)	16	0							120 U	280 U	196	200 U	210 U
Subsurface	4-Bromophenyl phenyl ether	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	4-Chloroaniline	(ug/kg)	16	0							50 U	140 U	59.9	50 U	100 U
Subsurface	4-Chlorophenyl phenyl ether	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	4-Nitroaniline	(ug/kg)	16	0							10 U	230 U	44.8	10 U	170 U
Subsurface	Benzoic acid	(ug/kg)	12	4	33.3	430	2600	1200	770	1000	250 U	2600	567	250 U	1000
Subsurface	Benzyl alcohol	(ug/kg)	16	0							19 U	50 U	45.1	50 U	50 U
Subsurface	Bis(2-chloroethoxy) methane	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	Bis(2-chloroethyl) ether	(ug/kg)	16	0							10 U	93 U	22.6	10 U	69 U
Subsurface	Carbazole	(ug/kg)	16	9	56.3	14	500	121	22	390	10 U	500	74.3	18	390
Subsurface	Dibenzofuran	(ug/kg)	16	11	68.8	7 J	630	147	16	360	5 U	630	103	10	360
Subsurface	Hexachlorobenzene	(ug/kg)	16	4	25.0	25	14000	3900	61	1500	10 U	14000	984	10 U	1500
Subsurface	Hexachlorobutadiene	(ug/kg)	18	4	22.2	19	34000	15000	57	26000	10 U	34000	3350	10 U	26000
Subsurface	Hexachlorocyclopentadiene	(ug/kg)	8	0							97 UJ	230 UJ	175	200 U	200 U
Subsurface	Hexachloroethane	(ug/kg)	16	6	37.5	31	20000	3410	95	160	31	20000	1300	40 U	160
Subsurface	Isophorone	(ug/kg)	16	1	6.3	43	43	43	43	43	10 U	47 U	17.1	10 U	43
Subsurface	Nitrobenzene	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	N-Nitrosodipropylamine	(ug/kg)	16	0							10 U	93 U	22.6	10 U	69 U
Subsurface	N-Nitrosodiphenylamine	(ug/kg)	16	0							10 U	47 U	15.1	10 U	35 U
Subsurface	1,1,1,2-Tetrachloroethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,1,1-Trichloroethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,1,2,2-Tetrachloroethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,1,2-Trichloroethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,1-Dichloroethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Vinylidene chloride	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,2,3-Trichloropropane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,2-Dichloroethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,2-Dichloropropane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Methyl N-butyl ketone	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	Benzene	(ug/kg)	14	0							5 U	300 U	52.1	9 U	300 U
Subsurface	Bromochloromethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Bromodichloromethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Bromoform	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Bromomethane	(ug/kg)	12	0							5 UJ	50 U	10.8	5 UJ	11 U
Subsurface	Carbon disulfide	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Carbon tetrachloride	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Chlorodibromomethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Chloroethane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Chloroform	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Chloromethane	(ug/kg)	12	0							5 UJ	50 U	10.8	5 U	11 U
Subsurface	cis-1,3-Dichloropropene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Methylene bromide	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Dichlorodifluoromethane	(ug/kg)	12	0							5 UJ	50 U	10.8	5 UJ	11 U
Subsurface	Ethylbenzene	(ug/kg)	14	0							5 U	300 U	52.1	9 U	300 U
Subsurface	Isopropylbenzene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	m,p-Xylene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Methylene chloride	(ug/kg)	12	0							10 U	100 U	21.6	10 U	22 U
Subsurface	o-Xylene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Styrene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U

Table 2. Surface and Subsurface Sediment Chemical Statistics near Arkema.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
Subsurface	Tetrachloroethene	(ug/kg)	12	1	8.3	8	8	8	8	8	5 U	50 U	11.1	8	11 U
Subsurface	Toluene	(ug/kg)	14	1	7.1	21	21	21	21	21	5 U	300 U	52.9	9 U	300 U
Subsurface	trans-1,2-Dichloroethene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	trans-1,3-Dichloropropene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Trichloroethene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Trichlorofluoromethane	(ug/kg)	12	0							5 UJ	50 U	10.8	5 UJ	11 U
Subsurface	Vinyl chloride	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,1-Dichloropropene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	1,2-Dibromo-3-chloropropane	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	1,3,5-Trimethylbenzene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	1,3-Dichloropropane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	2,2-Dichloropropane	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	2-Chlorotoluene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	4-Chlorotoluene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	Bromobenzene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	cis-1,2-Dichloroethene	(ug/kg)	12	0							5 U	50 U	10.8	5 U	11 U
Subsurface	Ethylene dibromide	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	n-Butylbenzene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	n-Propylbenzene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	Pseudocumene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	Sec-butylbenzene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	tert-Butylbenzene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	Cymene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	Xylene	(ug/kg)	2	0							300 U	300 U	300	300 U	300 U
Subsurface	Chlorobenzene	(ug/kg)	12	2	16.7	1900	18000	9950	1900	1900	5 U	18000	1660	5 U	1900
Subsurface	1,2-Dichlorobenzene	(ug/kg)	18	0							5 U	50 U	15.1	10 UG	47 U
Subsurface	1,3-Dichlorobenzene	(ug/kg)	18	0							5 U	50 U	15.1	10 UG	47 U
Subsurface	1,4-Dichlorobenzene	(ug/kg)	18	0							5 U	50 U	15.1	10 UG	47 U
Subsurface	1,2,3-Trichlorobenzene	(ug/kg)	12	0							20 U	200 U	43.3	20 U	45 U
Subsurface	1,2,4-Trichlorobenzene	(ug/kg)	18	4	22.2	12	530	156	40 G	41	10 U	530	50.3	12	47 U

SUPPLEMENTAL FIGURES

Figure 4. Map of Site, Adjacent Properties, and Areas of Concern
Figure 4-10. DDT, DDD, and DDE Concentrations in Surface Soil Samples (ERM 2004a)
Figure 5. DDT, DDD, and DDE Concentrations in Riverbank Soil Samples

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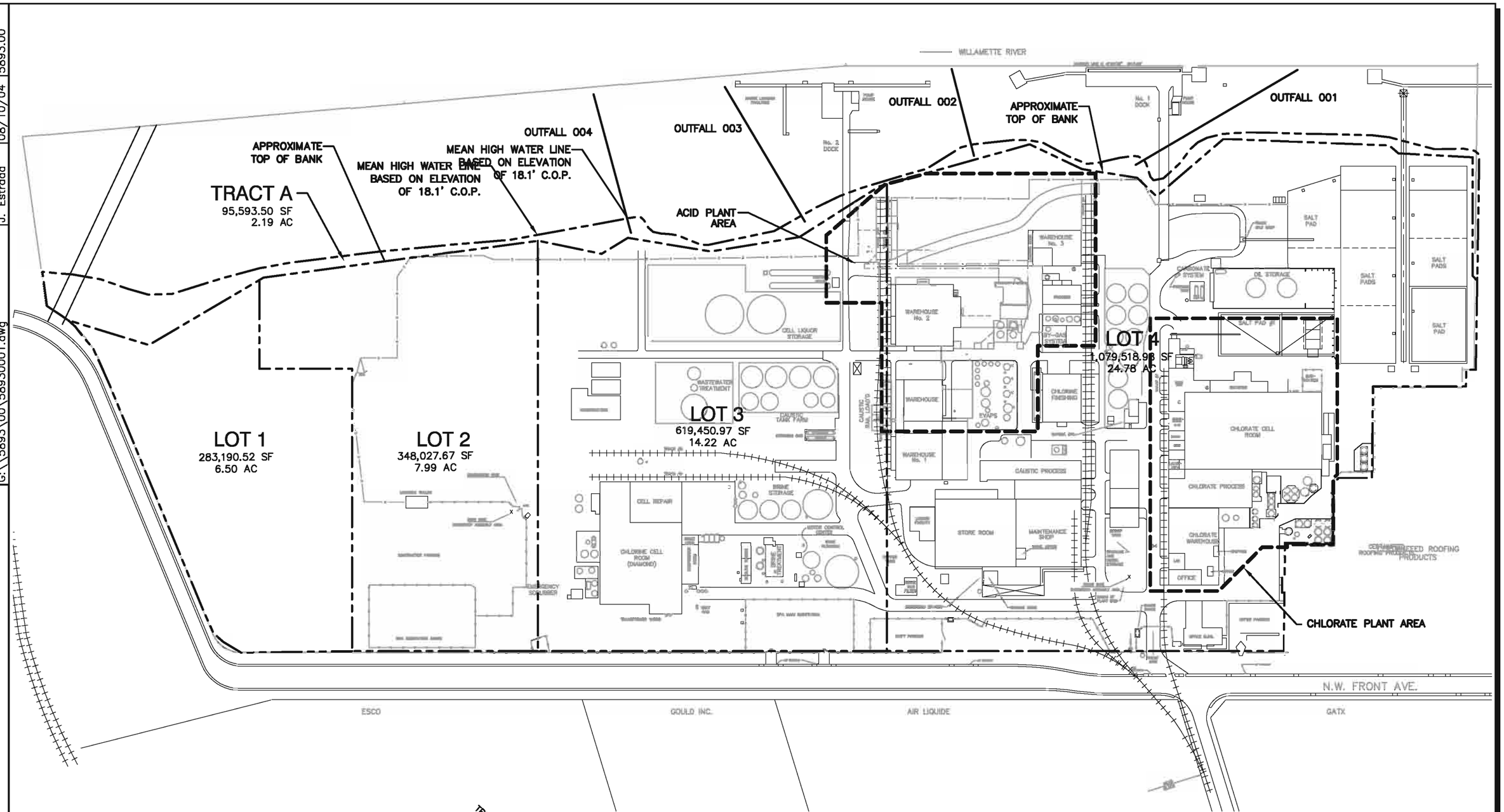

LEGEND

AREA OF CONCERN

APPROXIMATE LOT BOUNDARIES

TRUE NORTH

PLANT NORTH

0 200

FEET

Figure 4

Map of Site, Adjacent Properties, and Areas of Concern
Arkema Inc.
Portland, Oregon

ERM 08/04

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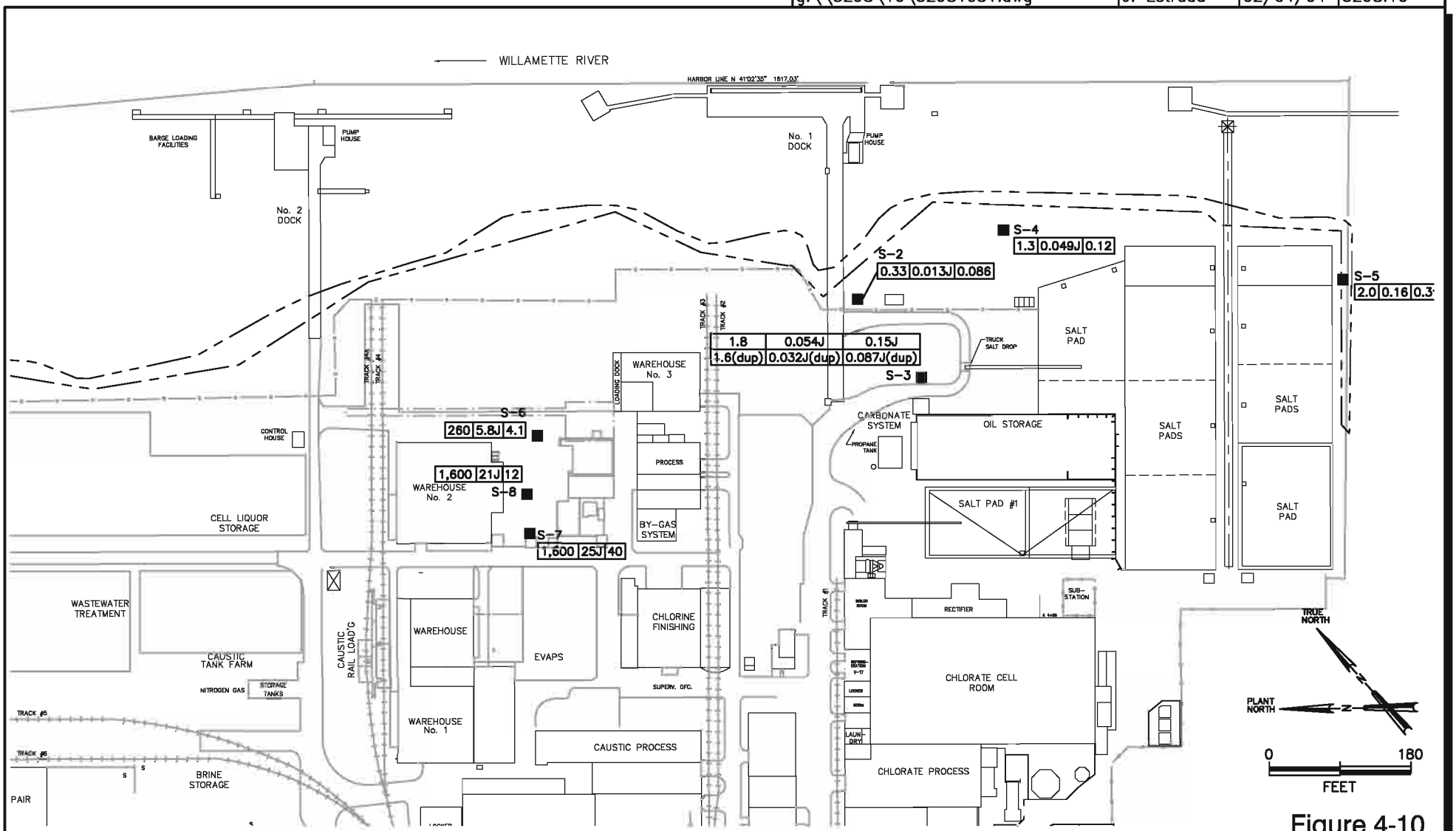

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■ Surface Soil Sample Location

1,600 | 25J | 40

- 1,600 — 4,4'-DDT Concentration (mg/kg)
- 25J — 4,4'-DDD Concentration (mg/kg)
- 40 — 4,4'-DDE Concentration (mg/kg)

J=Estimated Concentration

Figure 4-10

DDT, DDD, and DDE Concentrations in Soil
Surface Soil Samples
Arkema Inc.
Portland, Oregon

ERM *02/04*

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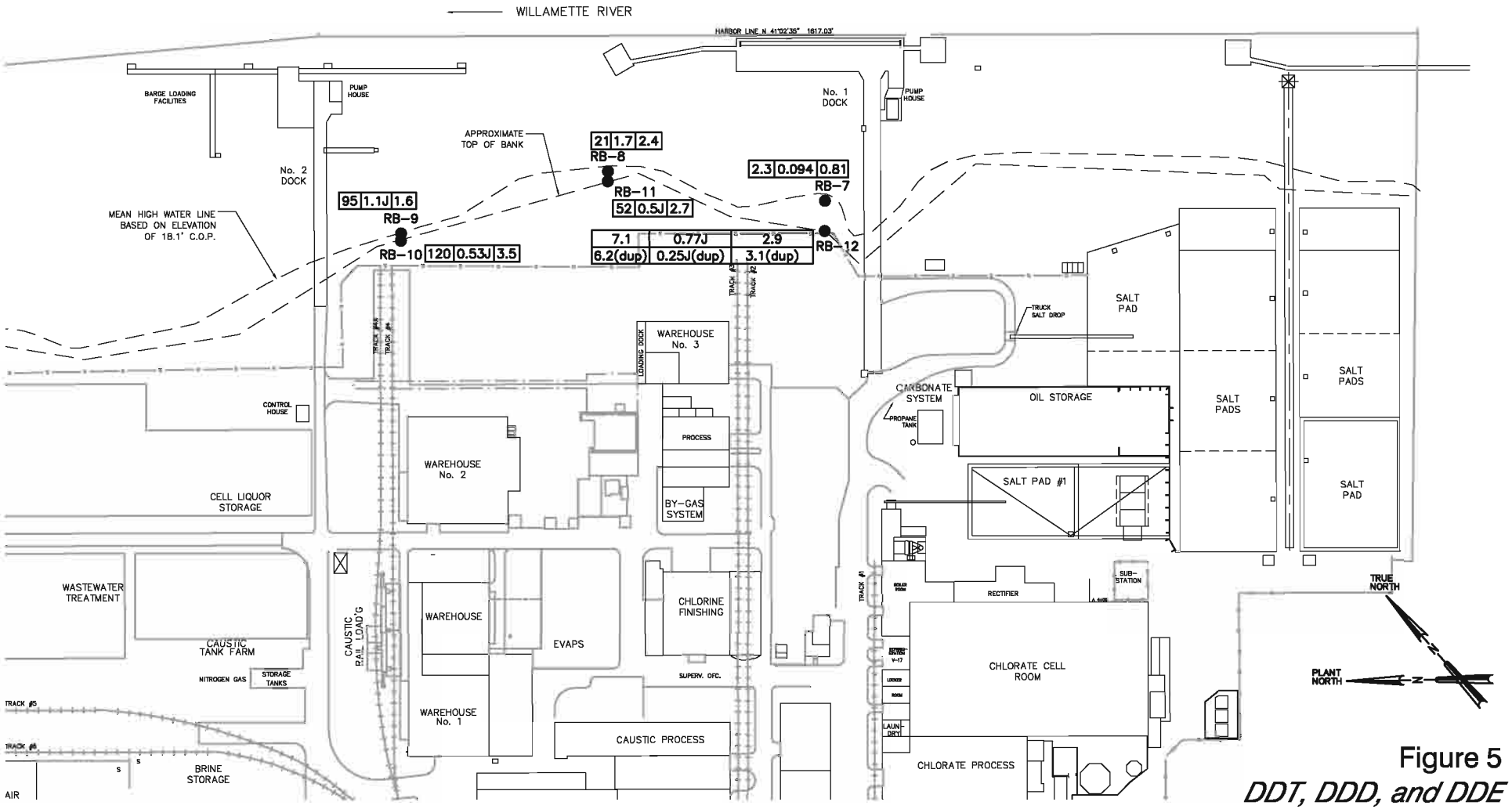

LEGEND

● Riverbank Soil Sample Location

- - - - - - Willamette River Bank

95 | 1.1J | 1.6

- 4,4'-DDT Concentration (mg/kg)
- 4,4'-DDD Concentration (mg/kg)
- 4,4'-DDE Concentration (mg/kg)

J=Estimated Concentration

0 180
FEET

Note:
A number of buildings and structures noted on this diagram have been demolished and/or removed.

Figure 5
DDT, DDD, and DDE Concentrations in Soil Riverbank Soil Samples
Arkema Inc.
Portland, Oregon

ERM *08/04*

SUPPLEMENTAL TABLES

Table 3. Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results – June 2003 (ATOFINA 2003)
Table 4. Volatile Organic Compound Results – June 2003 (ATOFINA 2003)
Table 5. Polynuclear Aromatic Hydrocarbon and Total Petroleum Hydrocarbon Results – June 2003 (ATOFINA 2003)
Table 6. Pesticide Results – June 2003 (ATOFINA 2003)

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This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 3
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-2 6/9/2003 GW-060903-01	MWA-3 6/9/2003 GW-060903-04	MWA-4 6/9/2003 GW-060903-07	MWA-5 6/6/2003 GW-060603-06	MWA-6r 6/5/2003 GW-060503-02	MWA-7 6/4/2003 GW-060403-01
Chromium	6020	mg/L	NA	NA	0.00236	NA	0.0189	NA
Iron	6010B	mg/L	11.8	0.100 U	NA	NA	NA	NA
Manganese	6010B	mg/L	1.16	0.189	NA	NA	NA	NA
Chloride	300.0	mg/L	981	107	234	859	1850	175
Nitrate-Nitrogen	300.0	mg/L	1.00 U	2.02	1.00 U	1.00 R	0.18	0.100 U
Nitrite-Nitrogen	300.0	mg/L	1.00 U	0.100 U	1.00 U	1.00 R	10.0 U	0.100 U
Sulfate	300.0	mg/L	490 J	46	299 J	10.0 UJ	110	69.8
Total Alkalinity	310.1	mg/L as CaCO3	43.5	314	500	742	894	378
Methane	RSK 175	µg/L	1.20 U	112	NA	NA	NA	2590
Total Organic Carbon	415.1	mg/L	6.05	3.74	23.8	23.2	16.2	13.8
Perchlorate	314.0	µg/L	1400	92 UF	100 UF	NA	27 UF	NA

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed
NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-8i 6/9/2003 GW-060903-02	MWA-9i 6/9/2003 GW-060903-06	MWA-10i 6/10/2003 GW-061003-01	MWA-11i 6/10/2003 GW-061003-03	MWA-12i 6/3/2003 GW-060303-01	MWA-13d 6/9/2003 GW-060903-03
Chromium	6020	mg/L	NA	NA	NA	NA	NA	NA
Iron	6010B	mg/L	NA	NA	NA	NA	NA	NA
Manganese	6010B	mg/L	NA	NA	NA	NA	NA	NA
Chloride	300.0	mg/L	2380	2860	1240	550	14.5	3240
Nitrate-Nitrogen	300.0	mg/L	1.00 U	1.00 U	1.00 U	1.00 U	0.100 UJ	1.00 U
Nitrite-Nitrogen	300.0	mg/L	1.00 U	10.0 U	1.00 U	1.00 U	0.100 UJ	1.00 U
Sulfate	300.0	mg/L	141 J	495 J	242	10.0 U	1.00 U	264 J
Total Alkalinity	310.1	mg/L as CaCO3	1100	650	548	308	445	454
Methane	RSK 175	µg/L	NA	NA	NA	NA	NA	NA
Total Organic Carbon	415.1	mg/L	43.9	49.6	13.7	5.19	5.38	8.86
Perchlorate	314.0	µg/L	20 U	730	260	20 U	NA	20 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed
NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-14i 6/6/2003 GW-060603-07	MWA-15r 6/10/2003 GW-061003-04	MWA-16i 6/5/2003 GW-060503-01	MWA-17si 6/9/2003 GW-060903-05	MWA-18 6/6/2003 GW-060603-03	MWA-19 6/6/2003 GW-060603-04
Chromium	6020	mg/L	NA	NA	0.992	NA	NA	NA
Iron	6010B	mg/L	NA	3.43	NA	NA	NA	NA
Manganese	6010B	mg/L	NA	0.0788	NA	NA	NA	NA
Chloride	300.0	mg/L	1720	388	2180	1970	1410	5180
Nitrate-Nitrogen	300.0	mg/L	1 J	10.4	0.100 U	1.6	2.9 J	1.8 J
Nitrite-Nitrogen	300.0	mg/L	1.00 R	1.00 U	10.0 U	10.0 U	1.00 R	10.0 R
Sulfate	300.0	mg/L	105 J	283	73	1900 J	37.4 J	61.2 J
Total Alkalinity	310.1	mg/L as CaCO3	668	865	710	10.0 U	211	243
Methane	RSK 175	µg/L	NA	121	NA	NA	NA	NA
Total Organic Carbon	415.1	mg/L	18.9	50.6	29.7	19.4	4.89	7.05
Perchlorate	314.0	µg/L	NA	350	33 UF	9900	NA	82 UF

Notes: F - Field quality control sample criteria not met
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NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-20 6/5/2003 GW-060503-03	MWA-22 6/10/2003 GW-061003-02	MWA-23 6/4/2003 GW-060403-02	MWA-23 7/29/2003 GW-072903-01	MWA-24 6/5/2003 GW-060503-04	MWA-25 6/6/2003 GW-060603-02
Chromium	6020	mg/L	NA	NA	0.00117	NA	NA	9.79
Iron	6010B	mg/L	NA	NA	12.7	NA	NA	0.100 U
Manganese	6010B	mg/L	NA	NA	4.22	NA	NA	0.173
Chloride	300.0	mg/L	1500	6210	43.4	NA	583	2980
Nitrate-Nitrogen	300.0	mg/L	0.77	1.00 U	0.69	NA	0.100 U	1.00 R
Nitrite-Nitrogen	300.0	mg/L	10.0 U	10.0 U	0.100 U	NA	10.0 U	10.0 R
Sulfate	300.0	mg/L	52.3	1190	154	NA	202	351 J
Total Alkalinity	310.1	mg/L as CaCO3	780	5720	153	NA	7230	986
Methane	RSK 175	µg/L	NA	NA	80.9	NA	NA	2470
Total Organic Carbon	415.1	mg/L	20.8	439	4.59	NA	889	29
Perchlorate	314.0	µg/L	NA	NA	NA	20 U,NV	NA	NA

Notes: F - Field quality control sample criteria not met
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NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-25 7/29/2003 GW-072903-04	MWA-26 6/4/2003 GW-060403-03	MWA-26 7/29/2003 GW-072903-02	MWA-27 6/4/2003 GW-060403-04	MWA-28i 6/6/2003 GW-060603-01	MWA-28i 7/29/2003 GW-072903-03
Chromium	6020	mg/L	NA	1.02	NA	4.3	0.00100 U	NA
Iron	6010B	mg/L	NA	NA	NA	0.100 U	NA	NA
Manganese	6010B	mg/L	NA	NA	NA	0.732	NA	NA
Chloride	300.0	mg/L	NA	632	NA	9360	5.36	NA
Nitrate-Nitrogen	300.0	mg/L	NA	0.65	NA	10.0 U	0.100 R	NA
Nitrite-Nitrogen	300.0	mg/L	NA	0.100 U	NA	10.0 U	0.100 R	NA
Sulfate	300.0	mg/L	NA	73.6	NA	290	1.00 UJ	NA
Total Alkalinity	310.1	mg/L as CaCO3	NA	219	NA	398	295	NA
Methane	RSK 175	µg/L	NA	NA	NA	148	NA	NA
Total Organic Carbon	415.1	mg/L	NA	8.32	NA	14.5	4.01	NA
Perchlorate	314.0	µg/L	290000 NV	NA	1200 NV	210000	NA	20 U,NV

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R - Rejected
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NA - Not analyzed
NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-29 6/4/2003 GW-060403-06	MWA-30 6/4/2003 GW-060403-08	MWA-31i 6/4/2003 GW-060403-07	MWA-32ia 6/4/2003 GW-060403-10	MWA-33 6/11/2003 GW-061103-02	MWA-33 6/11/2003 GW-061103-03
Chromium	6020	mg/L	0.0284	0.562	1.15	0.238	0.226	0.601
Iron	6010B	mg/L	NA	0.264	NA	NA	5.59	9.99
Manganese	6010B	mg/L	NA	1.19	NA	NA	0.142	0.219
Chloride	300.0	mg/L	11700	164000	61100	31000	286	210
Nitrate-Nitrogen	300.0	mg/L	10.0 U	100 U	100 U	100 U	1.00 U	1.00 U
Nitrite-Nitrogen	300.0	mg/L	10.0 U	100 U	100 U	100 U	1.00 U	1.00 U
Sulfate	300.0	mg/L	291	1530	381	399	156	167
Total Alkalinity	310.1	mg/L as CaCO3	212	78.8	147	286	1110	1190
Methane	RSK 175	µg/L	NA	2.18 J	NA	NA	4900	6450
Total Organic Carbon	415.1	mg/L	7.53	1.00 U	1.00 U	15.7	17.5	40.7
Perchlorate	314.0	µg/L	110 UF	7900	4700	200000	320	840

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NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-33a 6/5/2003 GW-060503-05	MWA-33 (Dup) 6/5/2003 GW-060503-06	MWA-34ia 6/6/2003 GW-060603-05	NMP-3D 6/11/2003 GW-061103-01	NMP-4D 6/10/2003 GW-061003-06	NMP-4D (Dup) 6/10/2003 GW-061003-07
Chromium	6020	mg/L	0.532	0.514	0.142	NA	NA	NA
Iron	6010B	mg/L	2.27	NA	NA	1.04	3.71	3.49
Manganese	6010B	mg/L	0.068	NA	NA	0.781	0.473	0.559
Chloride	300.0	mg/L	198	208	3040	2260	2180	2150
Nitrate-Nitrogen	300.0	mg/L	3.42 J	0.100 UJ	1.00 R	3	1.00 U	1.00 U
Nitrite-Nitrogen	300.0	mg/L	0.100 UJ	0.100 UJ	1.00 R	1.00 U	1.00 U	1.00 U
Sulfate	300.0	mg/L	177	196	80.3 J	2900	3470	3500
Total Alkalinity	310.1	mg/L as CaCO3	1200	1210	1950	50.0 U	25.4	22.5
Methane	RSK 175	µg/L	NA	NA	NA	1440	1030	1060
Total Organic Carbon	415.1	mg/L	22.9	22.3	34.5	28.8	37.6	39.9
Perchlorate	314.0	µg/L	540	570	4600	NA	NA	NA

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NA - Not analyzed
NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Inorganic Compounds, Natural Attenuation Parameters, and Conventional Analyte Results
June 2003 Groundwater Sampling

Analyte	Method	Units	Rinsate 6/4/2003 GW-060403-05	Rinsate 6/9/2003 GW-060903-08	Rinsate 6/10/2003 GW-061003-05	Trip Blank 6/3/2003 Trip Blank-01	Trip Blank 6/10/2003 Trip Blank-05
Chromium	6020	mg/L	0.00100 U	0.00100 U	NA	NA	NA
Iron	6010B	mg/L	NA	NA	NA	NA	NA
Manganese	6010B	mg/L	NA	NA	NA	NA	NA
Chloride	300.0	mg/L	NA	NA	NA	NA	NA
Nitrate-Nitrogen	300.0	mg/L	NA	NA	NA	NA	NA
Nitrite-Nitrogen	300.0	mg/L	NA	NA	NA	NA	NA
Sulfate	300.0	mg/L	NA	NA	NA	NA	NA
Total Alkalinity	310.1	mg/L as CaCO3	NA	NA	NA	NA	NA
Methane	RSK 175	µg/L	NA	NA	NA	1.20 U	1.20 U
Total Organic Carbon	415.1	mg/L	NA	NA	1.20 U	NA	NA
Perchlorate	314.0	µg/L	31	NA	20 U	NA	NA

Notes: F - Field quality control sample criteria not met
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U - Undetected at detection limit shown
NA - Not analyzed
NV - Not validated

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-2 6/9/2003 GW-060903-01	MWA-3 6/9/2003 GW-060903-04	MWA-4 6/9/2003 GW-060903-07	MWA-5 6/6/2003 GW-060603-06
1,1,1,2-Tetrachloroethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,1,1-Trichloroethane	8260B	µg/L	50.0 U	0.53	2.50 U	0.500 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,1,2-Trichloroethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,1-Dichloroethane	8260B	µg/L	50.0 U	1.62	2.50 U	2.61
1,1-Dichloroethene	8260B	µg/L	50.0 U	0.500 U	2.50 U	1.39
1,1-Dichloropropene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,2,3-Trichlorobenzene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
1,2,3-Trichloropropane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,2,4-Trichlorobenzene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
1,2,4-Trimethylbenzene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	200 U	2.00 U	10.0 U	2.00 U
1,2-Dibromoethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,2-Dichlorobenzene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,2-Dichloroethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,2-Dichloropropane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,3,5-Trimethylbenzene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
1,3-Dichlorobenzene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,3-Dichloropropane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
1,4-Dichlorobenzene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
2,2-Dichloropropane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
2-Butanone	8260B	µg/L	1000 U	10.0 U	50.0 U	10.0 U
2-Chlorotoluene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
2-Hexanone	8260B	µg/L	1000 U	10.0 U	50.0 U	10.0 U
4-Chlorotoluene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
4-Methyl-2-pentanone	8260B	µg/L	500 U	5.00 U	25.0 U	5.00 U
Acetone	8260B	µg/L	2000 U	20.0 U	100 U	20.0 U
Benzene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Bromobenzene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Bromochloromethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Bromodichloromethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Bromoform	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Bromomethane	8260B	µg/L	200 U	2.00 U	10.0 U	2.00 U
Carbon disulfide	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
Carbon tetrachloride	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Chlorobenzene	8260B	µg/L	13700	176	646	23.1
Chloroethane	8260B	µg/L	50.0 U	0.74	2.50 U	1.62
Chloroform	8260B	µg/L	144 U	7.65 U	4.55 U	0.500 U
Chloromethane	8260B	µg/L	200 U	2.00 U	10.0 U	2.00 U
cis-1,2-Dichloroethene	8260B	µg/L	50.0 U	4.45	2.50 U	0.500 U
cis-1,3-Dichloropropene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Dibromochloromethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Dibromomethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Dichlorodifluoromethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-2 6/9/2003 GW-060903-01	MWA-3 6/9/2003 GW-060903-04	MWA-4 6/9/2003 GW-060903-07	MWA-5 6/6/2003 GW-060603-06
Ethylbenzene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Hexachlorobutadiene	8260B	µg/L	200 U	2.00 U	10.0 U	2.00 U
Isopropylbenzene	8260B	µg/L	200 U	2.00 U	10.0 U	2.00 U
m,p-Xylene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
Methyl tert-butyl ether	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
Methylene chloride	8260B	µg/L	500 U	5.00 U	25.0 U	5.00 U
Naphthalene	8260B	µg/L	200 U	2.00 U	10.0 U	2.00 U
n-Butylbenzene	8260B	µg/L	500 U	5.00 U	25.0 U	5.00 U
n-Propylbenzene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
o-Xylene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
p-Isopropyltoluene	8260B	µg/L	200 U	2.00 U	10.0 U	2.00 U
sec-Butylbenzene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
Styrene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
tert-Butylbenzene	8260B	µg/L	100 U	1.00 U	5.00 U	1.00 U
Tetrachloroethene	8260B	µg/L	50.0 U	14.7	2.75	0.500 U
Toluene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
trans-1,2-Dichloroethene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
trans-1,3-Dichloropropene	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Trichloroethene	8260B	µg/L	50.0 U	5.54	2.50 U	0.500 U
Trichlorofluoromethane	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U
Vinyl chloride	8260B	µg/L	50.0 U	0.500 U	2.50 U	0.500 U

Notes: F - Field quality control sample criteria not met
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Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-6r 6/5/2003 GW-060503-02	MWA-7 6/4/2003 GW-060403-01	MWA-8i 6/9/2003 GW-060903-02	MWA-9i 6/9/2003 GW-060903-06
1,1,1,2-Tetrachloroethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,1,1-Trichloroethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,1,2-Trichloroethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,1-Dichloroethane	8260B	µg/L	10.0 U	0.500 U	1	100 U
1,1-Dichloroethene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,1-Dichloropropene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,2,3-Trichlorobenzene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
1,2,3-Trichloropropane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,2,4-Trichlorobenzene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
1,2,4-Trimethylbenzene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	40.0 U	2.00 U	2.00 U	400 U
1,2-Dibromoethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,2-Dichlorobenzene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,2-Dichloroethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,2-Dichloropropane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,3,5-Trimethylbenzene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
1,3-Dichlorobenzene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,3-Dichloropropane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
1,4-Dichlorobenzene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
2,2-Dichloropropane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
2-Butanone	8260B	µg/L	200 U	10.0 U	10.0 U	2000 U
2-Chlorotoluene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
2-Hexanone	8260B	µg/L	200 U	10.0 U	10.0 U	2000 U
4-Chlorotoluene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
4-Methyl-2-pentanone	8260B	µg/L	100 U	5.00 U	5.00 U	1000 U
Acetone	8260B	µg/L	400 U	20.0 R	20.0 U	4000 U
Benzene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Bromobenzene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Bromochloromethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Bromodichloromethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Bromoform	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Bromomethane	8260B	µg/L	40.0 U	2.00 U	2.00 U	400 U
Carbon disulfide	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
Carbon tetrachloride	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Chlorobenzene	8260B	µg/L	2620	0.500 U	22.7	32100
Chloroethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Chloroform	8260B	µg/L	14.2 U	0.500 U	0.500 U	100 U
Chloromethane	8260B	µg/L	40.0 U	2.00 U	2.00 U	400 U
cis-1,2-Dichloroethene	8260B	µg/L	67.2	0.500 U	0.500 U	100 U
cis-1,3-Dichloropropene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Dibromochloromethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Dibromomethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Dichlorodifluoromethane	8260B	µg/L	10.0 U	0.500 UJ	0.500 U	100 U

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-6r 6/5/2003 GW-060503-02	MWA-7 6/4/2003 GW-060403-01	MWA-8i 6/9/2003 GW-060903-02	MWA-9i 6/9/2003 GW-060903-06
Ethylbenzene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Hexachlorobutadiene	8260B	µg/L	40.0 U	2.00 U	2.00 U	400 U
Isopropylbenzene	8260B	µg/L	40.0 U	2.00 U	2.00 U	400 U
m,p-Xylene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
Methyl tert-butyl ether	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
Methylene chloride	8260B	µg/L	100 U	5.00 U	5.00 U	1000 U
Naphthalene	8260B	µg/L	40.0 U	2.00 U	2.00 U	400 U
n-Butylbenzene	8260B	µg/L	100 U	5.00 U	5.00 U	1000 U
n-Propylbenzene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
o-Xylene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
p-Isopropyltoluene	8260B	µg/L	40.0 U	2.00 U	2.00 U	400 U
sec-Butylbenzene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
Styrene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
tert-Butylbenzene	8260B	µg/L	20.0 U	1.00 U	1.00 U	200 U
Tetrachloroethene	8260B	µg/L	223	0.500 U	0.500 U	100 U
Toluene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
trans-1,2-Dichloroethene	8260B	µg/L	12.6	0.500 U	0.500 U	100 U
trans-1,3-Dichloropropene	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Trichloroethene	8260B	µg/L	38.8	0.500 U	0.500 U	100 U
Trichlorofluoromethane	8260B	µg/L	10.0 U	0.500 U	0.500 U	100 U
Vinyl chloride	8260B	µg/L	28.4	0.500 U	0.500 U	100 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-10i 6/10/2003 GW-061003-01	MWA-11i 6/10/2003 GW-061003-03	MWA-12i 6/3/2003 GW-060303-01	MWA-13d 6/9/2003 GW-060903-03
1,1,1,2-Tetrachloroethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,1,1-Trichloroethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,1,2-Trichloroethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.68
1,1-Dichloroethene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,1-Dichloropropene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,2,3-Trichlorobenzene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
1,2,3-Trichloropropane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
1,2,4-Trimethylbenzene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	200 U	2.00 U	2.00 U	2.00 U
1,2-Dibromoethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,2-Dichlorobenzene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,2-Dichloropropane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,3,5-Trimethylbenzene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
1,3-Dichlorobenzene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
1,4-Dichlorobenzene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
2,2-Dichloropropane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
2-Butanone	8260B	µg/L	1000 U	10.0 U	10.0 U	10.0 U
2-Chlorotoluene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
2-Hexanone	8260B	µg/L	1000 U	10.0 U	10.0 U	10.0 U
4-Chlorotoluene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
4-Methyl-2-pentanone	8260B	µg/L	500 U	5.00 U	5.00 U	5.00 U
Acetone	8260B	µg/L	2000 U	20.0 U	20.0 R	20.0 U
Benzene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Bromobenzene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Bromochloromethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Bromodichloromethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Bromoform	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Bromomethane	8260B	µg/L	200 U	2.00 U	2.00 U	2.00 U
Carbon disulfide	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
Carbon tetrachloride	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Chlorobenzene	8260B	µg/L	15800	0.71 U	0.500 U	10.6
Chloroethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Chloroform	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Chloromethane	8260B	µg/L	200 U	2.00 U	2.00 U	2.00 U
cis-1,2-Dichloroethene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
cis-1,3-Dichloropropene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Dibromochloromethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Dibromomethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Dichlorodifluoromethane	8260B	µg/L	50.0 U	0.500 U	0.500 UJ	0.500 U

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-10i 6/10/2003 GW-061003-01	MWA-11i 6/10/2003 GW-061003-03	MWA-12i 6/3/2003 GW-060303-01	MWA-13d 6/9/2003 GW-060903-03
Ethylbenzene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Hexachlorobutadiene	8260B	µg/L	200 U	2.00 U	2.00 U	2.00 U
Isopropylbenzene	8260B	µg/L	200 U	2.00 U	2.00 U	2.00 U
m,p-Xylene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
Methyl tert-butyl ether	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
Methylene chloride	8260B	µg/L	500 U	5.00 U	5.00 U	5.00 U
Naphthalene	8260B	µg/L	200 U	2.00 U	2.00 U	2.00 U
n-Butylbenzene	8260B	µg/L	500 U	5.00 U	5.00 U	5.00 U
n-Propylbenzene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
o-Xylene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
p-Isopropyltoluene	8260B	µg/L	200 U	2.00 U	2.00 U	2.00 U
sec-Butylbenzene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
Styrene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
tert-Butylbenzene	8260B	µg/L	100 U	1.00 U	1.00 U	1.00 U
Tetrachloroethene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Toluene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
trans-1,2-Dichloroethene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
trans-1,3-Dichloropropene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Trichloroethene	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Trichlorofluoromethane	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U
Vinyl chloride	8260B	µg/L	50.0 U	0.500 U	0.500 U	0.500 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-14i 6/6/2003 GW-060603-07	MWA-15r 6/10/2003 GW-061003-04	MWA-16i 6/5/2003 GW-060503-01	MWA-17si 6/9/2003 GW-060903-05
1,1,1,2-Tetrachloroethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,1,1-Trichloroethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,1,2-Trichloroethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,1-Dichloroethane	8260B	µg/L	1.7	50.0 U	0.82	500 U
1,1-Dichloroethene	8260B	µg/L	1.25	50.0 U	0.500 U	500 U
1,1-Dichloropropene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,2,3-Trichlorobenzene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
1,2,3-Trichloropropane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,2,4-Trichlorobenzene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
1,2,4-Trimethylbenzene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	2.00 U	200 U	2.00 U	2000 U
1,2-Dibromoethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,2-Dichlorobenzene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,2-Dichloroethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,2-Dichloropropane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,3,5-Trimethylbenzene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
1,3-Dichlorobenzene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,3-Dichloropropane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
1,4-Dichlorobenzene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
2,2-Dichloropropane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
2-Butanone	8260B	µg/L	10.0 U	1000 U	10.0 U	10000 U
2-Chlorotoluene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
2-Hexanone	8260B	µg/L	10.0 U	1000 U	10.0 U	10000 U
4-Chlorotoluene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
4-Methyl-2-pentanone	8260B	µg/L	5.00 U	500 U	5.00 U	5000 U
Acetone	8260B	µg/L	20.0 U	2000 U	20.0 U	20000 U
Benzene	8260B	µg/L	0.500 U	50.0 U	0.87	500 U
Bromobenzene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Bromochloromethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Bromodichloromethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Bromoform	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Bromomethane	8260B	µg/L	2.00 U	200 U	2.00 U	2000 U
Carbon disulfide	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
Carbon tetrachloride	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Chlorobenzene	8260B	µg/L	0.5 U	13300	17.5	73200
Chloroethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Chloroform	8260B	µg/L	0.500 U	219 U	0.71 U	550 U
Chloromethane	8260B	µg/L	2.00 U	200 U	2.00 U	2000 U
cis-1,2-Dichloroethene	8260B	µg/L	0.500 U	50.0 U	0.51	500 U
cis-1,3-Dichloropropene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Dibromochloromethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Dibromomethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Dichlorodifluoromethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-14i 6/6/2003 GW-060603-07	MWA-15r 6/10/2003 GW-061003-04	MWA-16i 6/5/2003 GW-060503-01	MWA-17si 6/9/2003 GW-060903-05
Ethylbenzene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Hexachlorobutadiene	8260B	µg/L	2.00 U	200 U	2.00 U	2000 U
Isopropylbenzene	8260B	µg/L	2.00 U	200 U	2.00 U	2000 U
m,p-Xylene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
Methyl tert-butyl ether	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
Methylene chloride	8260B	µg/L	5.00 U	500 U	5.00 U	5000 U
Naphthalene	8260B	µg/L	2.00 U	200 U	2.00 U	2000 U
n-Butylbenzene	8260B	µg/L	5.00 U	500 U	5.00 U	5000 U
n-Propylbenzene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
o-Xylene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
p-Isopropyltoluene	8260B	µg/L	2.00 U	200 U	2.00 U	2000 U
sec-Butylbenzene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
Styrene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
tert-Butylbenzene	8260B	µg/L	1.00 U	100 U	1.00 U	1000 U
Tetrachloroethene	8260B	µg/L	0.500 U	50.0 U	5.78	500 U
Toluene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
trans-1,2-Dichloroethene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
trans-1,3-Dichloropropene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Trichloroethene	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Trichlorofluoromethane	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U
Vinyl chloride	8260B	µg/L	0.500 U	50.0 U	0.500 U	500 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-18 6/6/2003 GW-060603-03	MWA-19 6/6/2003 GW-060603-04	MWA-20 6/5/2003 GW-060503-03	MWA-22 6/10/2003 GW-061003-02
1,1,1,2-Tetrachloroethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,1,1-Trichloroethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,1,2-Trichloroethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,1-Dichloroethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,1-Dichloroethene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,1-Dichloropropene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,2,3-Trichlorobenzene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
1,2,3-Trichloropropane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,2,4-Trichlorobenzene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
1,2,4-Trimethylbenzene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	2.00 U	2.00 U	4.00 U	4.00 U
1,2-Dibromoethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,2-Dichlorobenzene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,2-Dichloroethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,2-Dichloropropane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,3,5-Trimethylbenzene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
1,3-Dichlorobenzene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,3-Dichloropropane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
1,4-Dichlorobenzene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
2,2-Dichloropropane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
2-Butanone	8260B	µg/L	10.0 U	10.0 U	20.0 U	20.0 U
2-Chlorotoluene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
2-Hexanone	8260B	µg/L	10.0 U	10.0 U	20.0 U	20.0 U
4-Chlorotoluene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
4-Methyl-2-pentanone	8260B	µg/L	5.00 U	5.00 U	10.0 U	10.0 U
Acetone	8260B	µg/L	20.0 U	20.0 U	40.0 U	40.0 U
Benzene	8260B	µg/L	0.500 U	0.500 U	3.32	1.00 U
Bromobenzene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Bromochloromethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Bromodichloromethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Bromoform	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Bromomethane	8260B	µg/L	2.00 U	2.00 U	4.00 U	4.00 U
Carbon disulfide	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
Carbon tetrachloride	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Chlorobenzene	8260B	µg/L	3.06 U	0.64 U	215	128
Chloroethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Chloroform	8260B	µg/L	11.7 U	1.8 U	1.00 U	1.00 U
Chloromethane	8260B	µg/L	2.00 U	2.00 U	4.00 U	4.00 U
cis-1,2-Dichloroethene	8260B	µg/L	0.500 U	0.500 U	1.00 U	25.5
cis-1,3-Dichloropropene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Dibromochloromethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Dibromomethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Dichlorodifluoromethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-18 6/6/2003 GW-060603-03	MWA-19 6/6/2003 GW-060603-04	MWA-20 6/5/2003 GW-060503-03	MWA-22 6/10/2003 GW-061003-02
Ethylbenzene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Hexachlorobutadiene	8260B	µg/L	2.00 U	2.00 U	4.00 U	4.00 U
Isopropylbenzene	8260B	µg/L	2.00 U	2.00 U	4.00 U	4.00 U
m,p-Xylene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
Methyl tert-butyl ether	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
Methylene chloride	8260B	µg/L	5.00 U	5.00 U	10.0 U	10.0 U
Naphthalene	8260B	µg/L	2.00 U	2.00 U	4.00 U	4.00 U
n-Butylbenzene	8260B	µg/L	5.00 U	5.00 U	10.0 U	10.0 U
n-Propylbenzene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
o-Xylene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
p-Isopropyltoluene	8260B	µg/L	2.00 U	2.00 U	4.00 U	4.00 U
sec-Butylbenzene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
Styrene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
tert-Butylbenzene	8260B	µg/L	1.00 U	1.00 U	2.00 U	2.00 U
Tetrachloroethene	8260B	µg/L	22	64	1.00 U	1.00 U
Toluene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
trans-1,2-Dichloroethene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
trans-1,3-Dichloropropene	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Trichloroethene	8260B	µg/L	2.2	9.25	1.00 U	1.00 U
Trichlorofluoromethane	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.00 U
Vinyl chloride	8260B	µg/L	0.500 U	0.500 U	1.00 U	1.36

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-33a 6/5/2003 GW-060503-05	MWA-34ia 6/6/2003 GW-060603-05	NMP-3D 6/11/2003 GW-061103-01	NMP-4D 6/10/2003 GW-061003-06
1,1,1,2-Tetrachloroethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,1,1-Trichloroethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,1,2-Trichloroethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,1-Dichloroethane	8260B	µg/L	1.04	2.50 U	500 U	500 U
1,1-Dichloroethene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,1-Dichloropropene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,2,3-Trichlorobenzene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
1,2,3-Trichloropropane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,2,4-Trichlorobenzene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
1,2,4-Trimethylbenzene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	2.00 U	10.0 U	2000 U	2000 U
1,2-Dibromoethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,2-Dichlorobenzene	8260B	µg/L	2.13	2.50 U	500 U	500 U
1,2-Dichloroethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,2-Dichloropropane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,3,5-Trimethylbenzene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
1,3-Dichlorobenzene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,3-Dichloropropane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
1,4-Dichlorobenzene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
2,2-Dichloropropane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
2-Butanone	8260B	µg/L	10.0 U	50.0 U	10000 U	10000 U
2-Chlorotoluene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
2-Hexanone	8260B	µg/L	10.0 U	50.0 U	10000 U	10000 U
4-Chlorotoluene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
4-Methyl-2-pentanone	8260B	µg/L	5.00 U	25.0 U	5000 U	5000 U
Acetone	8260B	µg/L	20.0 U	100 U	20000 U	20000 U
Benzene	8260B	µg/L	1.35	2.6	500 U	500 U
Bromobenzene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Bromochloromethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Bromodichloromethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Bromoform	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Bromomethane	8260B	µg/L	2.00 U	10.0 U	2000 U	2000 U
Carbon disulfide	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
Carbon tetrachloride	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Chlorobenzene	8260B	µg/L	2.51 U	666	127000	185000
Chloroethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Chloroform	8260B	µg/L	0.8 U	10.2 U	510 U	1250 U
Chloromethane	8260B	µg/L	2.00 U	10.0 U	2000 U	2000 U
cis-1,2-Dichloroethene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
cis-1,3-Dichloropropene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Dibromochloromethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Dibromomethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Dichlorodifluoromethane	8260B	µg/L	0.500 U	2.50 U	500 UJ	500 UJ

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-33a 6/5/2003 GW-060503-05	MWA-34ia 6/6/2003 GW-060603-05	NMP-3D 6/11/2003 GW-061103-01	NMP-4D 6/10/2003 GW-061003-06
Ethylbenzene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Hexachlorobutadiene	8260B	µg/L	2.00 U	10.0 U	2000 U	2000 U
Isopropylbenzene	8260B	µg/L	2.00 U	10.0 U	2000 U	2000 U
m,p-Xylene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
Methyl tert-butyl ether	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
Methylene chloride	8260B	µg/L	5.00 U	25.0 U	5000 U	5000 U
Naphthalene	8260B	µg/L	2.00 U	10.0 U	2000 U	2000 U
n-Butylbenzene	8260B	µg/L	5.00 U	25.0 U	5000 U	5000 U
n-Propylbenzene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
o-Xylene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
p-Isopropyltoluene	8260B	µg/L	2.00 U	10.0 U	2000 U	2000 U
sec-Butylbenzene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
Styrene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
tert-Butylbenzene	8260B	µg/L	1.00 U	5.00 U	1000 U	1000 U
Tetrachloroethene	8260B	µg/L	0.500 U	3.3	500 U	500 U
Toluene	8260B	µg/L	0.91	2.50 U	500 U	500 U
trans-1,2-Dichloroethene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
trans-1,3-Dichloropropene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Trichloroethene	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Trichlorofluoromethane	8260B	µg/L	0.500 U	2.50 U	500 U	500 U
Vinyl chloride	8260B	µg/L	0.500 U	2.50 U	500 U	500 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	NMP-4D(Dup) 6/10/2003 GW-061003-07	Rinsate 6/10/2003 GW-061003-05	Trip Blank 6/3/2003 Trip Blank-01	Trip Blank 6/5/2003 Trip Blank-02
1,1,1,2-Tetrachloroethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,1,1-Trichloroethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,1,2-Trichloroethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloropropene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,2,3-Trichlorobenzene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
1,2,3-Trichloropropane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
1,2,4-Trimethylbenzene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	2000 U	2.00 U	2.00 U	2.00 U
1,2-Dibromoethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,2-Dichlorobenzene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloropropane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,3,5-Trimethylbenzene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
1,3-Dichlorobenzene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
1,4-Dichlorobenzene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
2,2-Dichloropropane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
2-Butanone	8260B	µg/L	10000 U	10.0 U	10.0 U	10.0 U
2-Chlorotoluene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
2-Hexanone	8260B	µg/L	10000 U	10.0 U	10.0 U	10.0 U
4-Chlorotoluene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
4-Methyl-2-pentanone	8260B	µg/L	5000 U	5.00 U	5.00 U	5.00 U
Acetone	8260B	µg/L	20000 U	20.0 U	20.0 R	20.0 U
Benzene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Bromobenzene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Bromochloromethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Bromodichloromethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Bromoform	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Bromomethane	8260B	µg/L	2000 U	2.00 U	2.00 U	2.00 U
Carbon disulfide	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
Carbon tetrachloride	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Chlorobenzene	8260B	µg/L	146000	0.71	0.500 U	0.500 U
Chloroethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Chloroform	8260B	µg/L	1130 U	2.5	0.500 U	0.500 U
Chloromethane	8260B	µg/L	2000 U	2.00 U	2.00 U	2.00 U
cis-1,2-Dichloroethene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
cis-1,3-Dichloropropene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Dibromochloromethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Dibromomethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Dichlorodifluoromethane	8260B	µg/L	500 UJ	0.500 U	0.500 UJ	0.500 U

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	NMP-4D(Dup) 6/10/2003 GW-061003-07	Rinsate 6/10/2003 GW-061003-05	Trip Blank 6/3/2003 Trip Blank-01	Trip Blank 6/5/2003 Trip Blank-02
Ethylbenzene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Hexachlorobutadiene	8260B	µg/L	2000 U	2.00 U	2.00 U	2.00 U
Isopropylbenzene	8260B	µg/L	2000 U	2.00 U	2.00 U	2.00 U
m,p-Xylene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
Methyl tert-butyl ether	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
Methylene chloride	8260B	µg/L	5000 U	5.00 U	5.00 U	5.00 U
Naphthalene	8260B	µg/L	2000 U	2.00 U	2.00 U	2.00 U
n-Butylbenzene	8260B	µg/L	5000 U	5.00 U	5.00 U	5.00 U
n-Propylbenzene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
o-Xylene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
p-Isopropyltoluene	8260B	µg/L	2000 U	2.00 U	2.00 U	2.00 U
sec-Butylbenzene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
Styrene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
tert-Butylbenzene	8260B	µg/L	1000 U	1.00 U	1.00 U	1.00 U
Tetrachloroethene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Toluene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
trans-1,2-Dichloroethene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
trans-1,3-Dichloropropene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Trichloroethene	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Trichlorofluoromethane	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U
Vinyl chloride	8260B	µg/L	500 U	0.500 U	0.500 U	0.500 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	Trip Blank 6/10/2003 Trip Blank-05	Trip Blank 6/10/2003 Trip Blank-09
1,1,1,2-Tetrachloroethane	8260B	µg/L	0.500 U	0.500 U
1,1,1-Trichloroethane	8260B	µg/L	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	8260B	µg/L	0.500 U	0.500 U
1,1,2-Trichloroethane	8260B	µg/L	0.500 U	0.500 U
1,1-Dichloroethane	8260B	µg/L	0.500 U	0.500 U
1,1-Dichloroethene	8260B	µg/L	0.500 U	0.500 U
1,1-Dichloropropene	8260B	µg/L	0.500 U	0.500 U
1,2,3-Trichlorobenzene	8260B	µg/L	1.00 U	1.00 U
1,2,3-Trichloropropane	8260B	µg/L	0.500 U	0.500 U
1,2,4-Trichlorobenzene	8260B	µg/L	1.00 U	1.00 U
1,2,4-Trimethylbenzene	8260B	µg/L	1.00 U	1.00 U
1,2-Dibromo-3-chloropropane	8260B	µg/L	2.00 U	2.00 U
1,2-Dibromoethane	8260B	µg/L	0.500 U	0.500 U
1,2-Dichlorobenzene	8260B	µg/L	0.500 U	0.500 U
1,2-Dichloroethane	8260B	µg/L	0.500 U	0.500 U
1,2-Dichloropropane	8260B	µg/L	0.500 U	0.500 U
1,3,5-Trimethylbenzene	8260B	µg/L	1.00 U	1.00 U
1,3-Dichlorobenzene	8260B	µg/L	0.500 U	0.500 U
1,3-Dichloropropane	8260B	µg/L	0.500 U	0.500 U
1,4-Dichlorobenzene	8260B	µg/L	0.500 U	0.500 U
2,2-Dichloropropane	8260B	µg/L	0.500 UJ	0.500 U
2-Butanone	8260B	µg/L	10.0 U	10.0 U
2-Chlorotoluene	8260B	µg/L	1.00 U	1.00 U
2-Hexanone	8260B	µg/L	10.0 U	10.0 U
4-Chlorotoluene	8260B	µg/L	1.00 U	1.00 U
4-Methyl-2-pentanone	8260B	µg/L	5.00 U	5.00 U
Acetone	8260B	µg/L	20.0 U	20.0 U
Benzene	8260B	µg/L	0.500 U	0.500 U
Bromobenzene	8260B	µg/L	0.500 U	0.500 U
Bromochloromethane	8260B	µg/L	0.500 U	0.500 U
Bromodichloromethane	8260B	µg/L	0.500 U	0.500 U
Bromoform	8260B	µg/L	0.500 U	0.500 U
Bromomethane	8260B	µg/L	2.00 U	2.00 U
Carbon disulfide	8260B	µg/L	1.00 U	1.00 U
Carbon tetrachloride	8260B	µg/L	0.500 U	0.500 U
Chlorobenzene	8260B	µg/L	0.500 U	0.500 U
Chloroethane	8260B	µg/L	0.500 U	0.500 U
Chloroform	8260B	µg/L	0.500 U	0.500 U
Chloromethane	8260B	µg/L	2.00 U	2.00 U
cis-1,2-Dichloroethene	8260B	µg/L	0.500 U	0.500 U
cis-1,3-Dichloropropene	8260B	µg/L	0.500 U	0.500 U
Dibromochloromethane	8260B	µg/L	0.500 U	0.500 U
Dibromomethane	8260B	µg/L	0.500 U	0.500 U
Dichlorodifluoromethane	8260B	µg/L	0.500 U	0.500 U

Table 4
ATOFINA Chemicals, Inc. - Portland, Oregon
Volatile Organic Compound Results
June 2003 Groundwater Sampling

Analyte	Method	Units	Trip Blank 6/10/2003 Trip Blank-05	Trip Blank 6/10/2003 Trip Blank-09
Ethylbenzene	8260B	µg/L	0.500 U	0.500 U
Hexachlorobutadiene	8260B	µg/L	2.00 U	2.00 U
Isopropylbenzene	8260B	µg/L	2.00 U	2.00 U
m,p-Xylene	8260B	µg/L	1.00 U	1.00 U
Methyl tert-butyl ether	8260B	µg/L	1.00 U	1.00 U
Methylene chloride	8260B	µg/L	5.00 U	5.00 U
Naphthalene	8260B	µg/L	2.00 U	2.00 U
n-Butylbenzene	8260B	µg/L	5.00 U	5.00 U
n-Propylbenzene	8260B	µg/L	1.00 U	1.00 U
o-Xylene	8260B	µg/L	0.500 U	0.500 U
p-Isopropyltoluene	8260B	µg/L	2.00 U	2.00 U
sec-Butylbenzene	8260B	µg/L	1.00 U	1.00 U
Styrene	8260B	µg/L	0.500 U	0.500 U
tert-Butylbenzene	8260B	µg/L	1.00 U	1.00 U
Tetrachloroethene	8260B	µg/L	0.500 U	0.500 U
Toluene	8260B	µg/L	0.500 U	0.500 U
trans-1,2-Dichloroethene	8260B	µg/L	0.500 U	0.500 U
trans-1,3-Dichloropropene	8260B	µg/L	0.500 UJ	0.500 U
Trichloroethene	8260B	µg/L	0.500 U	0.500 U
Trichlorofluoromethane	8260B	µg/L	0.500 U	0.500 U
Vinyl chloride	8260B	µg/L	0.500 U	0.500 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 5
ATOFINA Chemicals, Inc. - Portland, Oregon
Polynuclear Aromatic Hydrocarbon and Total Petroleum Hydrocarbon Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-30 6/4/2003 GW-060403-08	MWA-32ia 6/4/2003 GW-060403-10	MWA-32 (Dup) 6/4/2003 GW-060403-11	Rinsate 6/4/2003 GW-060403-09
TPH						
Diesel Range Organics	NWTPH-Dx	mg/L	0.642	0.342	0.32	0.25 U
Heavy Oil Range Hydrocarbon	NWTPH-Dx	mg/L	0.500 U	0.500 U	0.500 U	0.500 U
PAHs						
Acenaphthene	8270 Mod	µg/L	0.100 U	0.272	0.256	0.125 U
Acenaphthylene	8270 Mod	µg/L	0.100 U	0.100 U	0.100 U	0.125 U
Anthracene	8270 Mod	µg/L	0.100 U	0.118	0.101	0.125 U
Benzo (a) anthracene	8270 Mod	µg/L	0.100 U	0.100 U	0.100 U	0.125 U
Benzo (a) pyrene	8270 Mod	µg/L	0.100 U	0.100 U	0.100 U	0.125 U
Benzo (b) fluoranthene	8270 Mod	µg/L	0.100 U	0.100 U	0.100 U	0.125 U
Benzo (ghi) perylene	8270 Mod	µg/L	0.100 U	0.100 UJ	0.100 UJ	0.125 UJ
Benzo (k) fluoranthene	8270 Mod	µg/L	0.100 U	0.100 U	0.100 U	0.125 U
Chrysene	8270 Mod	µg/L	0.100 U	0.100 U	0.100 U	0.125 U
Dibenzo (a,h) anthracene	8270 Mod	µg/L	0.200 U	0.200 U	0.200 U	0.250 U
Fluoranthene	8270 Mod	µg/L	0.100 U	0.100 U	0.100 U	0.125 U
Fluorene	8270 Mod	µg/L	0.100 U	0.269	0.229	0.125 U
Indeno (1,2,3-cd) pyrene	8270 Mod	µg/L	0.100 U	0.100 UJ	0.100 UJ	0.125 UJ
Naphthalene	8270 Mod	µg/L	0.100 U	0.531	0.494	0.125 U
Phenanthrene	8270 Mod	µg/L	0.110 U	0.579	0.548	0.125 U
Pyrene	8270 Mod	µg/L	0.100 U	0.241	0.185	0.125 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 6
ATOFINA Chemicals, Inc. - Portland, Oregon
Pesticide Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-2 6/9/2003 GW-060903-01	MWA-3 6/9/2003 GW-060903-04	MWA-4 6/9/2003 GW-060903-07	MWA-5 6/6/2003 GW-060603-06	MWA-6r 6/5/2003 GW-060503-02	MWA-7 6/4/2003 GW-060403-01	MWA-8i 6/9/2003 GW-060903-02
4,4´-DDD	8081A	µg/L	4.00 U	0.0861	3.97	0.0400 U	0.0400 R	0.0400 UJ	0.0400 U
4,4´-DDE	8081A	µg/L	8.00 U	0.0800 U	0.233	0.0800 U	0.0800 R	0.0800 UJ	0.0800 U
4,4´-DDT	8081A	µg/L	8.00 U	0.362	0.0899 U	0.0916	0.214 J	0.0800 UJ	0.0800 U
Aldrin	8081A	µg/L	8.00 U	0.0800 U	0.0899 U	0.0800 U	0.0800 R	0.0800 UJ	0.0800 U
alpha-BHC	8081A	µg/L	4.00 U	0.0400 U	0.0449 U	0.0400 U	0.0400 R	0.0400 UJ	0.0400 U
alpha-Chlordane	8081A	µg/L	4.00 U	0.0400 U	0.0449 U	0.0400 U	0.0400 R	0.0400 UJ	0.0400 U
beta-BHC	8081A	µg/L	4.00 U	0.0400 U	0.0449 U	0.0400 U	0.0400 R	0.0400 UJ	0.0400 U
Chlordane (tech)	8081A	µg/L	50.0 U	0.500 U	0.562 U	0.500 U	0.500 R	0.500 UJ	0.500 U
delta-BHC	8081A	µg/L	10.0 U	0.100 U	0.112 U	0.100 U	0.100 R	0.100 UJ	0.100 U
Dieldrin	8081A	µg/L	8.00 U	0.0800 U	0.0899 U	0.0800 U	0.0800 R	0.0800 UJ	0.0800 U
Endosulfan I	8081A	µg/L	2.00 U	0.0200 U	0.0225 U	0.0200 U	0.0200 R	0.0200 UJ	0.0200 U
Endosulfan II	8081A	µg/L	8.00 U	0.0800 U	0.0899 U	0.0800 U	0.0800 R	0.0800 UJ	0.0800 U
Endosulfan sulfate	8081A	µg/L	10.0 U	0.100 U	0.112 U	0.100 U	0.100 R	0.100 UJ	0.100 U
Endrin	8081A	µg/L	8.00 U	0.0800 U	0.0899 U	0.0800 U	0.0800 R	0.0800 UJ	0.0800 U
Endrin aldehyde	8081A	µg/L	16.0 U	0.160 U	0.180 U	0.160 U	0.160 R	0.160 UJ	0.160 U
Endrin ketone	8081A	µg/L	8.00 U	0.0800 U	0.0899 U	0.0800 U	0.0800 R	0.0800 UJ	0.0800 U
gamma-BHC (Lindane)	8081A	µg/L	4.00 U	0.0400 U	0.0449 U	0.0400 U	0.0400 R	0.0400 UJ	0.0400 U
gamma-Chlordane	8081A	µg/L	4.00 U	0.0400 U	0.0449 U	0.0400 U	0.0400 R	0.0400 UJ	0.0400 U
Heptachlor	8081A	µg/L	8.00 U	0.0800 U	0.0899 U	0.0800 U	0.0800 R	0.0800 UJ	0.0800 U
Heptachlor epoxide	8081A	µg/L	4.00 U	0.0400 U	0.0449 U	0.0400 U	0.0400 R	0.0400 UJ	0.0400 U
Methoxychlor	8081A	µg/L	50.0 U	0.500 U	0.562 U	0.500 U	0.500 R	0.500 UJ	0.500 U
Toxaphene	8081A	µg/L	200 U	2.00 U	2.25 U	2.00 U	2.00 R	2.00 UJ	2.00 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 6
ATOFINA Chemicals, Inc. - Portland, Oregon
Pesticide Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-9i 6/9/2003 GW-060903-06	MWA-10i 6/10/2003 GW-061003-01	MWA-11i 6/10/2003 GW-061003-03	MWA-12i 6/3/2003 GW-060303-01	MWA-13d 6/9/2003 GW-060903-03	MWA-14i 6/6/2003 GW-060603-07	MWA-15r 6/10/2003 GW-061003-04
4,4´-DDD	8081A	µg/L	1.1	0.0455 UJ	1.2	0.0400 UJ	0.0807	0.0439	28.4 J
4,4´-DDE	8081A	µg/L	0.0899 U	0.0909 UJ	0.0800 U	0.0800 UJ	0.0800 U	0.0800 U	16.0 U
4,4´-DDT	8081A	µg/L	0.0899 U	0.0909 UJ	0.573 U	0.0800 UJ	0.0800 U	0.0800 U	113
Aldrin	8081A	µg/L	0.0899 U	0.0909 UJ	0.0800 U	0.0800 UJ	0.0800 U	0.0800 U	16.0 U
alpha-BHC	8081A	µg/L	0.0449 U	0.0455 UJ	0.0400 U	0.0400 UJ	0.0400 U	0.0400 U	8.00 U
alpha-Chlordane	8081A	µg/L	0.0449 U	0.0455 UJ	0.0400 U	0.0400 UJ	0.0400 U	0.0400 U	8.00 U
beta-BHC	8081A	µg/L	0.0449 U	0.0455 UJ	0.0400 U	0.0400 UJ	0.0400 U	0.0400 U	8.00 U
Chlordane (tech)	8081A	µg/L	0.562 U	0.568 UJ	0.500 U	0.500 UJ	0.500 U	0.500 U	100 U
delta-BHC	8081A	µg/L	0.112 U	0.114 UJ	0.100 U	0.100 UJ	0.100 U	0.100 U	20.0 U
Dieldrin	8081A	µg/L	0.0899 U	0.0909 UJ	0.0800 U	0.0800 UJ	0.0800 U	0.0800 U	16.0 U
Endosulfan I	8081A	µg/L	0.0225 U	0.0227 UJ	0.0200 U	0.0200 UJ	0.0200 U	0.0200 U	4.38
Endosulfan II	8081A	µg/L	0.0899 U	0.0909 UJ	0.0800 U	0.0800 UJ	0.0800 U	0.0800 U	16.0 U
Endosulfan sulfate	8081A	µg/L	0.112 U	0.114 UJ	0.100 U	0.100 UJ	0.100 U	0.100 U	20.0 U
Endrin	8081A	µg/L	0.0899 U	0.0909 UJ	0.0800 U	0.0800 UJ	0.0800 U	0.0800 U	16.0 U
Endrin aldehyde	8081A	µg/L	0.180 U	0.182 UJ	0.160 U	0.160 UJ	0.160 U	0.160 U	32.0 U
Endrin ketone	8081A	µg/L	0.0899 U	0.0909 UJ	0.0800 U	0.0800 UJ	0.0800 U	0.0800 U	16.0 U
gamma-BHC (Lindane)	8081A	µg/L	0.0449 U	0.0455 UJ	0.0400 U	0.0400 UJ	0.0400 U	0.0400 U	8.00 U
gamma-Chlordane	8081A	µg/L	0.0449 U	0.0455 UJ	0.0400 U	0.0400 UJ	0.0400 U	0.0400 U	8.00 U
Heptachlor	8081A	µg/L	0.0899 U	0.0909 UJ	0.0800 U	0.0800 UJ	0.0800 U	0.0800 U	16.0 U
Heptachlor epoxide	8081A	µg/L	0.0449 U	0.0455 UJ	0.0400 U	0.0400 UJ	0.0400 U	0.0400 U	8.00 U
Methoxychlor	8081A	µg/L	0.562 U	0.568 UJ	0.500 U	0.500 UJ	0.500 U	0.500 U	100 U
Toxaphene	8081A	µg/L	2.25 U	2.27 UJ	2.00 U	2.00 UJ	2.00 U	2.00 U	400 U

Notes: F - Field quality control sample criteria not met
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Table 6
ATOFINA Chemicals, Inc. - Portland, Oregon
Pesticide Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-16i 6/5/2003 GW-060503-01	MWA-17si 6/9/2003 GW-060903-05	MWA-18 6/6/2003 GW-060603-03	MWA-19 6/6/2003 GW-060603-04	MWA-20 6/5/2003 GW-060503-03	MWA-22 6/10/2003 GW-061003-02	MWA-24 6/5/2003 GW-060503-04
4,4´-DDD	8081A	µg/L	0.0400 R	1.44	0.0400 U	0.0935	0.0688 J	0.13 U	0.232 U
4,4´-DDE	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.0800 U	0.0800 R	0.0800 UJ	0.160 U
4,4´-DDT	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.23	0.213 J	0.348 U	0.160 U
Aldrin	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.0800 U	0.0800 R	0.0800 UJ	0.160 U
alpha-BHC	8081A	µg/L	0.0400 R	0.200 U	0.0400 U	0.0400 U	0.0400 R	0.0400 UJ	0.0800 U
alpha-Chlordane	8081A	µg/L	0.0400 R	0.200 U	0.0400 U	0.0400 U	0.0400 R	0.0400 UJ	0.0800 U
beta-BHC	8081A	µg/L	0.0400 R	0.200 U	0.0400 U	0.0400 U	0.0400 R	0.0400 UJ	0.0800 U
Chlordane (tech)	8081A	µg/L	0.500 R	2.50 U	0.500 U	0.500 U	0.500 R	0.500 UJ	1.00 U
delta-BHC	8081A	µg/L	0.100 R	0.500 U	0.100 U	0.100 U	0.100 R	0.100 UJ	0.200 U
Dieldrin	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.0800 U	0.0800 R	0.0800 UJ	0.160 U
Endosulfan I	8081A	µg/L	0.0200 R	0.100 U	0.0200 U	0.0200 U	0.0200 R	0.0200 UJ	0.0400 U
Endosulfan II	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.0800 U	0.0800 R	0.0800 UJ	0.160 U
Endosulfan sulfate	8081A	µg/L	0.100 R	0.500 U	0.100 U	0.100 U	0.100 R	0.100 UJ	0.200 U
Endrin	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.0800 U	0.0800 R	0.0800 UJ	0.160 U
Endrin aldehyde	8081A	µg/L	0.160 R	0.800 U	0.160 U	0.160 U	0.160 R	0.160 UJ	0.320 U
Endrin ketone	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.0800 U	0.0800 R	0.0800 UJ	0.160 U
gamma-BHC (Lindane)	8081A	µg/L	0.0400 R	0.389	0.0400 U	0.0400 U	0.0400 R	0.0400 UJ	0.0800 U
gamma-Chlordane	8081A	µg/L	0.0400 R	0.200 U	0.0400 U	0.0400 U	0.0400 R	0.0400 UJ	0.0800 U
Heptachlor	8081A	µg/L	0.0800 R	0.400 U	0.0800 U	0.0800 U	0.0800 R	0.0800 UJ	0.160 U
Heptachlor epoxide	8081A	µg/L	0.0400 R	0.428	0.0400 U	0.0400 U	0.0400 R	0.0400 UJ	0.0800 U
Methoxychlor	8081A	µg/L	0.500 R	2.50 U	0.500 U	0.500 U	0.500 R	0.500 UJ	1.00 U
Toxaphene	8081A	µg/L	2.00 R	10.0 U	2.00 U	2.00 U	2.00 R	2.00 UJ	4.00 U

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 6
ATOFINA Chemicals, Inc. - Portland, Oregon
Pesticide Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-29 6/4/2003 GW-060403-06	MWA-30 6/4/2003 GW-060403-08	MWA-31i 6/4/2003 GW-060403-07	MWA-32ia 6/4/2003 GW-060403-10	MWA-33a 6/5/2003 GW-060503-05	MWA-33 6/11/2003 GW-061103-02	MWA-33 6/11/2003 GW-061103-03
4,4´-DDD	8081A	µg/L	0.0400 UJ	0.0400 UJ	0.0400 U	0.0400 UJ	0.0400 R	0.0400 UJ	0.0400 UJ
4,4´-DDE	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.0800 UJ	0.0800 UJ
4,4´-DDT	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.518 U	0.678 U
Aldrin	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.0800 UJ	0.0800 UJ
alpha-BHC	8081A	µg/L	0.0400 UJ	0.0400 UJ	0.0400 U	0.0400 UJ	0.0400 R	0.0400 UJ	0.0400 UJ
alpha-Chlordane	8081A	µg/L	0.0400 UJ	0.0400 UJ	0.0400 U	0.0400 UJ	0.0400 R	0.0400 UJ	0.0400 UJ
beta-BHC	8081A	µg/L	0.0400 UJ	0.0400 UJ	0.0400 U	0.0400 UJ	0.0400 R	0.0400 UJ	0.0400 UJ
Chlordane (tech)	8081A	µg/L	0.500 UJ	0.500 UJ	0.500 U	0.500 UJ	0.500 R	0.500 UJ	0.500 UJ
delta-BHC	8081A	µg/L	0.100 UJ	0.100 UJ	0.100 U	0.100 UJ	0.100 R	0.100 UJ	0.100 UJ
Dieldrin	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.0800 UJ	0.0800 UJ
Endosulfan I	8081A	µg/L	0.0200 UJ	0.0200 UJ	0.0200 U	0.0200 UJ	0.0200 R	0.0200 UJ	0.0200 UJ
Endosulfan II	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.0800 UJ	0.0800 UJ
Endosulfan sulfate	8081A	µg/L	0.100 UJ	0.100 UJ	0.100 U	0.100 UJ	0.100 R	0.100 UJ	0.100 UJ
Endrin	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.0800 UJ	0.0800 UJ
Endrin aldehyde	8081A	µg/L	0.160 UJ	0.160 UJ	0.160 U	0.160 UJ	0.160 R	0.160 UJ	0.160 UJ
Endrin ketone	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.0800 UJ	0.0800 UJ
gamma-BHC (Lindane)	8081A	µg/L	0.0400 UJ	0.0400 UJ	0.0400 U	0.0400 UJ	0.0400 R	0.0400 UJ	0.0400 UJ
gamma-Chlordane	8081A	µg/L	0.0400 UJ	0.0400 UJ	0.0400 U	0.0400 UJ	0.0400 R	0.0400 UJ	0.0400 UJ
Heptachlor	8081A	µg/L	0.0800 UJ	0.0800 UJ	0.0800 U	0.0800 UJ	0.0800 R	0.0800 UJ	0.0800 UJ
Heptachlor epoxide	8081A	µg/L	0.0400 UJ	0.0400 UJ	0.0400 U	0.0400 UJ	0.0400 R	0.0400 UJ	0.0400 UJ
Methoxychlor	8081A	µg/L	0.500 UJ	0.500 UJ	0.500 U	0.500 UJ	0.500 R	0.500 UJ	0.500 UJ
Toxaphene	8081A	µg/L	2.00 UJ	2.00 UJ	2.00 U	2.00 UJ	2.00 R	2.00 UJ	2.00 UJ

Notes: F - Field quality control sample criteria not met
J - Estimated
R - Rejected
U - Undetected at detection limit shown
NA - Not analyzed

Table 6
ATOFINA Chemicals, Inc. - Portland, Oregon
Pesticide Results
June 2003 Groundwater Sampling

Analyte	Method	Units	MWA-34ia 6/6/2003 GW-060603-05	NMP-3D 6/11/2003 GW-061103-01	NMP-4D 6/10/2003 GW-061003-06	NMP-4D (Dup) 6/10/2003 GW-061003-07	Rinsate 6/5/2003 GW-060503-07	Rinsate 6/10/2003 GW-061003-05
4,4´-DDD	8081A	µg/L	0.0892	0.800 U	6.26 J	8.86 J	0.0400 U	0.0412 J
4,4´-DDE	8081A	µg/L	0.0800 U	1.60 U	8.00 U	8.00 U	0.0800 U	0.0800 U
4,4´-DDT	8081A	µg/L	0.327	5.8 U	282	235	0.0800 U	1.19
Aldrin	8081A	µg/L	0.0800 U	1.60 U	8.00 U	8.00 U	0.0800 U	0.0800 U
alpha-BHC	8081A	µg/L	0.0400 U	0.800 U	4.00 U	4.00 U	0.0400 U	0.0400 U
alpha-Chlordane	8081A	µg/L	0.0400 U	0.800 U	4.00 U	4.00 U	0.0400 U	0.0400 U
beta-BHC	8081A	µg/L	0.0400 U	0.800 U	4.00 U	4.00 U	0.0400 U	0.0400 U
Chlordane (tech)	8081A	µg/L	0.500 U	10.0 U	50.0 U	50.0 U	0.500 U	0.500 U
delta-BHC	8081A	µg/L	0.100 U	2.00 U	10.0 U	10.0 U	0.100 U	0.100 U
Dieldrin	8081A	µg/L	0.0800 U	1.60 U	8.00 U	8.00 U	0.0800 U	0.0800 U
Endosulfan I	8081A	µg/L	0.0200 U	0.400 U	2.00 U	2.00 U	0.0200 U	0.0200 U
Endosulfan II	8081A	µg/L	0.0800 U	1.60 U	8.00 U	8.00 U	0.0800 U	0.0800 U
Endosulfan sulfate	8081A	µg/L	0.100 U	2.00 U	10.0 U	10.0 U	0.100 U	0.100 U
Endrin	8081A	µg/L	0.0800 U	1.60 U	8.00 U	8.00 U	0.0800 U	0.0800 U
Endrin aldehyde	8081A	µg/L	0.160 U	3.20 U	16.0 U	16.0 U	0.160 U	0.160 U
Endrin ketone	8081A	µg/L	0.0800 U	1.60 U	8.00 U	8.00 U	0.0800 U	0.0800 U
gamma-BHC (Lindane)	8081A	µg/L	0.0400 U	0.800 U	4.00 U	4.00 U	0.0400 U	0.0400 U
gamma-Chlordane	8081A	µg/L	0.0400 U	0.800 U	4.00 U	4.00 U	0.0400 U	0.0400 U
Heptachlor	8081A	µg/L	0.0800 U	1.60 U	8.00 U	8.00 U	0.0800 U	0.0800 U
Heptachlor epoxide	8081A	µg/L	0.0400 U	1.15	4.00 U	4.00 U	0.0400 U	0.0400 U
Methoxychlor	8081A	µg/L	0.500 U	10.0 U	50.0 U	50.0 U	0.500 U	0.500 U
Toxaphene	8081A	µg/L	2.00 U	40.0 U	200 U	200 U	2.00 U	2.00 U

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Appendix M
Oregon Water Resources Department Water Well Search Results

Results from Well Log Search on State of Oregon Water Resources Department Web Site (http://apps.wrd.state.or.us/apps/gw/well_log/well_log.php)

county_co	well_log_id	startcard_n	townsh	twp_ch	range	rng_ch	sectior	quarte	quarte	name_la	name_fir	company_name	first_wat	comple	complete_date	received_date	bonded_company	street_of_well	well_id_nu	work_abandonm	work_new_con	use_commu	use_dome	use_industr	use_irriga	use_monito
MULT	801		1	N	1	W	12					NORTHWEST NATURAL GAS CO. RECT 22		0	10/22/1985	11/12/1985	HANSEN DRILLING CO. INC.			N	Y	N	N	N	N	N
MULT	802		1	N	1	W	12	SW	SW			PORTLAND GAS AND COKE CO.		382	12/31/1954	12/31/1954				N	Y	Y	N	N	N	N
WASH	88	21230	1	N	1	W	12	SW	NE	BOUCH	DEBORA	WICKART, WILLIAM	90	170	7/31/1990	8/8/1990				N	Y	N	Y	N	N	N
MULT	805		1	N	1	W	13	SE	SE			PENNSALT CHEMICAL CORP.		15	1/14/1969	1/24/1969	HANSEN DRILLING CO. INC.			N	Y	N	N	N	N	N
MULT	78373	176721	1	N	1	W	13	SW	NE			ARKEMA INC.	30	37	7/26/2005	8/3/2005	CASCADE DRILLING INC.	6400 NW FRONT AVE, PORTLAND	79152	N	Y	N	N	N	N	
MULT	804		1	N	1	W	13					LIQUID AIR INC.	200	302	8/15/1973	8/22/1973	A M JANNSEN DRILLING CO.			N	Y	N	N	Y	N	N
MULT	808		1	N	1	W	13	NE	SE			PENN SALT CO.		760	9/30/1953	9/30/1953				N	Y	N	N	N	N	N
MULT	59667	118748	1	N	1	W	12	SW	NW			CITY OF PORTLAND	40	104	11/5/1999	12/7/1999	SCHNEIDER EQUIPMENT CO	CATHEDRAL PARK; SW END OF N PITTS	33779	N	Y	N	N	N	Y	N
MULT	78375	176726	1	N	1	W	13	SW	NE			ARKEMA INC.	25	30.5	7/27/2005	8/3/2005	CASCADE DRILLING INC.	6400 NW FRONT AVE, PORTLAND	79157	N	Y	N	N	N	N	
MULT	78378	176724	1	N	1	W	13	SW	NE			ARKEMA INC.	25	34	7/27/2005	8/3/2005	CASCADE DRILLING INC.	6400 NW FRONT AVE, PORTLAND	79155	N	Y	N	N	N	N	
WASH	4625		1	N	1	W	12	SW	NE	JOHNS	TIM		90	140	9/17/1988	9/21/1988				N	Y	N	Y	N	N	N
MULT	78376	176720	1	N	1	W	13	SW	NE			ARKEMA INC.	25	30	7/25/2005	8/3/2005	CASCADE DRILLING INC.	6400 NW FRONT AVE, PORTLAND	79151	N	Y	N	N	N	N	
MULT	71437		1	N	1	W	12	NW	SW			TOYOTA FACILITY; ENVIRONMEN	80	151	6/30/1988	11/12/2003	STADELI'S H20 GROUP	TOYOTA FACILITY, PORTLAND		N	Y	N	N	N	N	
MULT	803		1	N	1	W	13					LIQUID AIR INC.		0	8/9/1973	8/22/1973	A M JANNSEN DRILLING CO.			Y	Y	N	N	Y	N	N
MULT	806		1	N	1	W	13	SE	SE			PENNSALT CHEMICAL CORP.		15	1/16/1969	1/24/1969	HANSEN DRILLING CO. INC.			N	Y	N	N	N	N	N
WASH	61401	169072	1	N	1	W	13	NW	SW	GARDE	ANGELA	DOW BROS INC. (C/O)		0	8/6/2004	8/13/2004	A M JANNSEN DRILLING	17930 NW WALKER RD, BEAVERTON		Y	N	N	Y	N	N	
MULT	78374	176722	1	N	1	W	13	SW	NE			ARKEMA INC.	25	32.5	7/26/2005	8/3/2005	CASCADE DRILLING INC.	6400 NW FRONT AVE, PORTLAND	79153	N	Y	N	N	N	N	
MULT	807		1	N	1	W	13	NE	SE			PENN SALT CO.		420	4/30/1949	12/31/1949				N	Y	N	N	N	N	N
MULT	78377	176723	1	N	1	W	13	SW	NE			ARKEMA INC.	30	38	7/27/2005	8/3/2005	CASCADE DRILLING INC.	6400 NW FRONT AVE, PORTLAND	79154	N	Y	N	N	N	N	
MULT	78379	176725	1	N	1	W	13	SW	NE			ARKEMA INC.	25	29.5	7/27/2005	8/3/2005	CASCADE DRILLING INC.	6400 NW FRONT AVE, PORTLAND	79156	N	Y	N	N	N	N	
MULT	868		1	N	1	W	24			WINN S	THOMAS R			175	7/20/1958	7/30/1958				N	Y	N	Y	N	N	N
MULT	941		1	N	1	E	7	SW	SW			MCCORMICK AND BAXTER CO.		95	2/1/1968	2/26/1968	R J STRASSER DRILLING CO.			N	Y	N	N	Y	N	N
MULT	942		1	N	1	E	7	SW	SW			MCCORMICK AND BAXTER CREOSOTING		130	9/30/1945	9/30/1945	R J STRASSER DRILLING CO.			N	Y	N	N	Y	N	N
MULT	940		1	N	1	E	7	SW	SW			MCCORMICK AND BAXTER CO.	0	0	NULL	2/26/1968	R J STRASSER DRILLING CO.			Y	N	N	N	Y	N	N
MULT	952		1	N	1	E	7		NE			CLARENDEN SCHOOL; SCHOOL DISTRICT		394	5/3/1971	2/28/1972	HANSEN DRILLING CO. INC.			N	Y	N	N	N	N	N
MULT	939		1	N	1	E	7	SE	NW			FRED MEYER INC.		248	8/25/1962	9/5/1962	R J STRASSER DRILLING CO.			N	Y	N	N	N	N	N
MULT	55043	111731	1	N	1	E	7	NW	NW			FRED MEYER STORES INC.		240	1/16/1998	2/5/1998	GEO-TECH EXPLORATIONS	6850 N LOMBARD	1	Y	N	N	N	Y	N	Y
MULT	577	26099	1	N	1	E	7	NW	SW			NORTHWEST NATURAL GAS CO. RECT 16		0	12/6/1991	1/7/1992		N CAREY BLVD & N AMHERST; NOT A WATER WEL		N	Y	N	N	N	N	N
MULT	943		1	N	1	E	7	SW	SW			MCCORMICK AND BAXTER CO.		130	9/30/1945	9/30/1945				N	Y	N	N	Y	N	N
MULT	991	9987	1	N	1	E	19	SE	NW			CHEVRON USA INC.	94	310	4/26/1989	5/26/1989		5501 NW FRONT AVE		N	Y	N	N	Y	N	N
MULT	989		1	N	1	E	18	NW	SW			FIBREBOARD PAPER PRODUCTS CO.		425	NULL	NULL				N	Y	N	N	Y	N	N
MULT	996		1	N	1	E	19		NE			NORTHWEST NATURAL GAS CO.		0	10/22/1982	10/26/1982	HANSEN DRILLING CO. INC.			N	Y	N	N	N	N	N
MULT	987		1	N	1	E	18					UNIVERSITY OF PORTLAND		247	9/30/1965	10/18/1965	A M JANNSEN DRILLING CO.			N	Y	N	N	N	Y	N
MULT	51461	85690	1	N	1	E	19	SW	NE			SCHNITZER STEEL INDUSTRIES			6/26/1996	7/15/1996	TACOMA PUMP & DRILLING (	4959 SW FRONT		Y	N	N	N	N	N	N
MULT	56735		1	N	1	E	19					NW NATURAL GAS			11/3/1969	11/4/1998				N	N	N	N	N	N	N
MULT	990		1	N	1	E	18	NW	SW			FIBREBOARD PAPER PRODUCTS CORP.		240	12/31/1945	12/31/1945	TUALATIN VALLEY DRILLING CO.			N	Y	N	N	Y	N	N
MULT	998		1	N	1	E	19		NE			NORTHWEST NATURAL GAS CO.		0	10/20/1982	10/26/1982	HANSEN DRILLING CO. INC.			N	Y	N	N	N	N	N
MULT	997		1	N	1	E	19		NE			NORTHWEST NATURAL GAS CO.		0	10/21/1982	10/26/1982	HANSEN DRILLING CO.			N	Y	N	N	N	N	N

Notes:

- In 1997 CH2M Hill survey.
- On Arkema property - monitoring well incorrectly labelled as water well.
- Outside of search radius (>1 mile) from Site.
- Determined to be monitoring well.
- Abandonned well.
- Cathodic protection well.