23

Metropolitan Water Reclamation District of Greater Chicago

RESEARCH AND DEVELOPMENT DEPARTMENT

REPORT NO. 03-23

THORNTON TRANSITIONAL FLOOD CONTROL RESERVOIR

PRE-OPERATIONAL BACKGROUND GROUNDWATER QUALITY

REPORT 2002-2003

December 2003

Metropolitan Water Reclamation District of Greater Chicago
100 East Erie Street Chicago, IL 60611-2803 (312) 751-5600

THORNTON TRANSITIONAL FLOOD CONTROL RESERVOIR PRE-OPERATIONAL BACKGROUND GROUNDWATER QUALITY REPORT 2002-2003

By

Jain S. Jain
Research Scientist III

Dale MacDonald
Research Scientist I

Bernard Sawyer
Assistant Director of Research and Development
Environmental Monitoring and Research Division

Research and Development Department
Richard Lanyon, Director

December 2003

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

INTRODUCTION

The purpose of this report is to meet the reporting requirements of the Illinois Environmental Protection Agency (IEPA) relative to pre-operational background groundwater quality in the four groundwater monitoring wells associated with the Thornton Transitional Flood Control Reservoir (Reservoir). The specific informational requirements are described in the June 26, 2001 Scope of Work (SOW) for Groundwater Quality Monitoring for the Reservoir. The SOW was approved as part of the plan for the Reservoir in a letter from the IEPA dated August 6, 2001. The SOW and letter are found in Appendix AI.

The reporting requirements are found in Section 7 of the SOW. The requirements for the background groundwater quality report are as follows:

1. Narrative project description and field work.
2. All laboratory analytical data and QA/QC results.
3. Engineering quality drawings to scale including the location of the monitoring wells.
4. Groundwater elevation data, including a calculation of groundwater flow direction.

5. Chain-of-Custody sheets and field notes.
6. The background statistical analysis for each well.
7. Any other pertinent information required by IEPA.

Objective

The objective of collecting groundwater quality data from the four monitoring wells QT-1, QT-2, QT-3, and QT-4 at the Reservoir is to establish pre-operational background groundwater quality data at this site in order to allow comparison and assessment of any possible contamination which may result from the seepage produced during the operation of the Reservoir. Figure 1 shows the location of the four monitoring wells at the Reservoir.

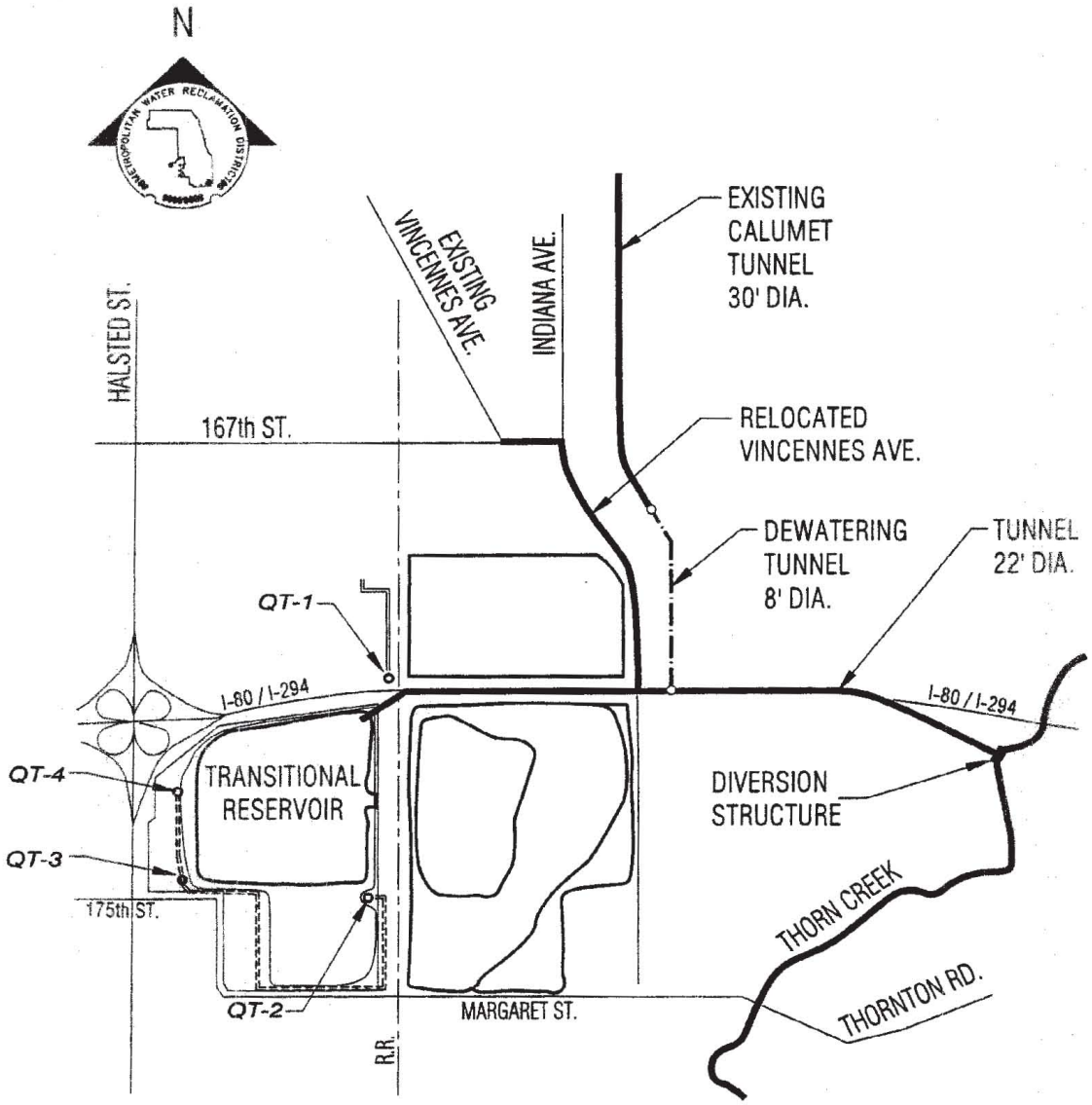
Project Description

The Reservoir is in the West Lobe of Thornton Quarry, southeast of the intersection of the Tri-State Tollway and Halsted Street in Thornton, Illinois. The Reservoir is the final structural measure to be implemented for the Little Calumet River Watershed under the Natural Resources Conservation Service (NRCS) Little Calumet River Watershed Plan of November 1978. The Reservoir will provide 3.1 billion gallons

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 1

THORNTON TRANSITIONAL RESERVOIR
MONITORING WELL LOCATIONS

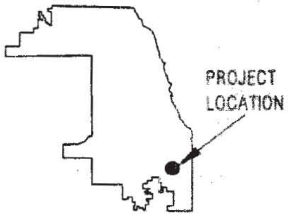


LOCATION MAP
Scale: NTS

LEGEND

- Monitoring Well
- New Access Road
- Existing Access Road (to be improved)

MWRD SERVICE AREA



of floodwater storage, which represents the capture of the 100-year storm event from Thorn Creek at a point just south of the Tri-State Tollway.

The project will provide flood control benefits for 21 businesses and 4,400 residences, for an average benefit of $6.8 million per year. Within the Little Calumet River watershed, the communities of Blue Island, Calumet City, Dixmoor, Dolton, Glenwood, Harvey, Lansing, Phoenix, Riverdale, and South Holland will receive flood control benefits.

The Reservoir consists of a diversion structure at Thorn Creek, a 24-foot diameter dropshaft, and 22-foot diameter conveyance tunnel to the Lower West Lobe of Thornton Quarry. The project also includes an 8-foot diameter tunnel connected to the Calumet Tunnel and Reservoir Plan (TARP) System that will be utilized for Reservoir dewatering purposes only.

Field Sampling and Analytical Methods

As required by IEPA, six sets of background groundwater quality samples were collected from each of the four wells beginning October 24, 2002 and ending on May 21, 2003.

All samples collected were analyzed for the IEPA specified inorganic and organic constituents as shown in Table 1.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1

GROUNDWATER QUALITY STANDARDS FOR CLASS I:
POTABLE RESOURCE GROUNDWATER

Inorganic Chemical Constituents

Arsenic
Barium
Cadmium
Chloride
Chromium
Copper
Cyanide
Fluoride
Iron
Lead
Manganese
Mercury
Nitrate as N
Radium-226
Radium-228
Selenium
Silver
Sulfate
Total Dissolved Solids (TDS)
pH

Organic Chemical Constituents

Alachlor
Aldicarb
Atrazine
Benzene*
Carbofuran
Carbon Tetrachloride*
Chlordane*
Endrin
Heptachlor*
Heptachlor Epoxide*
Lindane (Gamma-Hexachlorocyclohexane)
2,4,D
Ortho-Dichlorobenzene
Para-Dichlorobenzene
1,2 Dichloroethane*
1,1 Dichloroethylene
Trans 1,2-Dichloroethylene
1,2 Dichloropropane*
Ethylbenzene
Methoxychlor
Monochlorobenzene
Pentachlorophenol*
Polychlorinated Biphenyls (PCBs) (as decachloro-biphenyl)*
Styrene
2,4,5-TP (Silvex)
Tetrachloroethylene*
Toluene
Toxaphene*
1,1,1-Trichloroethane
Trichloroethylene*
Vinyl Chloride*
Xylenes
Benzene*
BETX

---

*Denotes a carcinogen.

Depending upon the constituent, samples were analyzed at either the District's Calumet Water Reclamation Plant (WRP) Laboratory, John E. Egan WRP Laboratory, Stickney WRP Laboratory, or a private laboratory (U. S. Biosystems). All of these laboratories have NELAC accreditation for the parameters of interest. Tables AI-1 and AI-2 list the analytical methods used by the various laboratories, and also give each laboratory's NELAC accreditation number. In order to obtain NELAC certification, all of the laboratories practice comprehensive QA/QC procedures which are documented in their accreditation materials submitted to the IEPA.

Field Sampling Log-In Sheets and Chain-of-Custody Forms

All 18 Chain-of-Custody forms are attached in Appendix AIII.

Analytical Data and Statistical Analysis

Table 2 contains organic constituents and Table 3 contains inorganic constituents for the samples collected from well QT-1. Similarly, Tables 4 and 5 give data for well QT-2, Tables 6 and 7 for well QT-3, and Tables 8 and 9 for well QT-4.

As can be seen from Tables 2, 4, 6 and 8, all organic constituents in groundwater monitoring wells QT-1, QT-2, QT-3,

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 2

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-1

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Alachlor	0.01	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Aldicarb	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Atrazine	0.01	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Benzene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Carbofuran	3	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Carbon Tetrachloride	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Chlordane	0.30	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Endrin	0.07	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Heptachlor	0.07	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Heptachlor Epoxide	0.05	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Lindane (Gamma-Hexachloro Cyclohexane)	0.05	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
2,4-D	2.5	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
ortho-Dichlorobenzene	4	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
para-Dichlorobenzene	4	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
1,2-Dichloroethane	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
1,1-Dichloroethylene	3	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
trans 1,2-Dichloroethylene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
1,2-Dichloropropane	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Ethylbenzene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Methoxychlor	0.1	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Monochlorobenzene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Pentachlorophenol	50	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Polychlorinated Biphenyls (PCBs) (as decachloro-biphenyl)	0.3	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 2 (Continued)

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-1

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Styrene	1	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
2,4,5-TP (Silvex)	0.5	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Tetrachloroethylene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Toluene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Toxaphene	1	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
1,1,1-Trichloroethylene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Trichloroethylene	2*	0.5*	0.5*	0.5*	0.5*	0.5*	2
Vinyl Chloride	3	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Ortho Xylene	2	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
Xylenes	1	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**
BETX	1	BDL**	BDL**	BDL**	BDL**	BDL**	BDL**

*One-half of the MDL value which is 1 µg/L. The upper 95 percent confidence limit in this case calculates to 2 µg/L which happens to be its reporting limit as well.

**Below detection limits. No upper confidence limit can be calculated.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 3

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-1

Date	Arsenic mg/L	Barium mg/L	Cadmium mg/L	Chloride mg/L	Chromium mg/L	Copper mg/L	Cyanide mg/L
10/24/02	0.001	0.0772	0.0001	573	0.0027	0.001	0.001
3/26/03	0.004	0.0545	0.0003	503	0.0040	0.009	0.001
4/10/03	0.001	0.0891	0.0001	458	0.0040	0.016	0.001
4/24/03	0.001	0.0799	0.0001	459	0.0030	0.010	0.001
5/8/03	0.001	0.0885	0.0001	452	0.0030	0.001	0.001
5/21/03	0.001	0.0788	0.0004	453	0.0040	0.006	0.001
Mean	0.002	0.0780	0.0002	483	0.0035	0.007	0.001
Std. Dev.	0.001	0.0126	0.0001	48	0.0006	0.006	0.000
Upper Confidence Limit 95 Percent**	0.004	0.1054	0.0005	588	0.0048	0.020	0.001

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 3 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER
MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-1

Date	Fluoride mg/L	Iron mg/L	Lead mg/L	Manganese mg/L	Mercury µg/L	Nitrate as N mg/L
10/24/02	0.45	0.735	0.008	0.0189	0.03	0.003
3/26/03	0.48	3.053	0.006	0.0359	0.05	0.014
4/10/03	0.06	3.827	0.007	0.0272	0.03	0.003
4/24/03	0.37	27.901	0.008	0.0965	0.03	0.003
5/8/03	0.36	27.206	0.006	0.0929	0.03	0.003
5/21/03	0.38	38.530	0.008	0.1564	0.19	0.022
Mean	0.35	16.875	0.007	0.0713	0.060	0.008
Std. Dev.	0.15	16.242	0.001	0.0535	0.064	0.008
Upper Confidence Limit 95 Percent**	0.68	52.226	0.009	0.1876	0.200	0.026

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 3 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-1

Date	Radium 226 pCi/L	Radium 228 pCi/L	Selenium mg/L	Silver mg/L	Sulfate mg/L	TDS mg/L	pH
10/24/02	2.20	1.50	0.016	BDL*	328	1806	7.3
3/26/03	2.60	2.10	0.003	BDL*	370	1802	7.2
4/10/03	2.10	2.10	0.008	BDL*	392	1774	7.2
4/24/03	2.10	1.30	0.000	BDL*	436	2022	7.2
5/8/03	2.20	1.70	0.000	BDL*	423	2080	7.2
5/21/03	2.40	1.90	0.000	BDL*	436	1938	7.2
Mean	2.27	1.77	0.0045		398	1904	7.2
Std. Dev.	0.20	0.33	0.0064		43	129	0.0
Upper Confidence Limit 95 Percent**	2.69	2.48	0.0185		491	2184	7.3

*Below detection limit. Silver reporting limit is 0.0003 mg/L. No upper confidence limit can be calculated.

**One tailed t value was used in the calculation of the upper level 95 percent confidence limit except for pH where a two tailed t value was used.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 4

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-2

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Alachlor	0.01	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Aldicarb	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Atrazine	0.01	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Benzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Carbofuran	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Carbon Tetrachloride	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Chlordane	0.30	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Endrin	0.07	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Heptachlor	0.07	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Heptachlor Epoxide	0.05	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Lindane (Gamma-Hexachloro Cyclohexane)	0.05	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
2,4-D	2.5	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
ortho-Dichlorobenzene	4	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
para-Dichlorobenzene	4	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,2-Dichloroethane	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,1-Dichloroethylene	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
trans 1,2-Dichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,2-Dichloropropane	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Ethylbenzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Methoxychlor	0.1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Monochlorobenzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Pentachlorophenol	50	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Polychlorinated Biphenyls (PCBs) (as decachloro-biphenyl)	0.3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 4 (Continued)

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-2

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Styrene	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
2,4,5-TP (Silvex)	0.5	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Tetrachloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Toluene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Toxaphene	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,1,1-Trichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Trichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Vinyl Chloride	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Ortho Xylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Xylenes	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
BETX	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*

*Below detection limits. No upper confidence limit can be calculated.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 5

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-2

Date	Arsenic mg/L	Barium mg/L	Cadmium mg/L	Chloride mg/L	Chromium mg/L	Copper mg/L	Cyanide mg/L
10/24/02	0.001	0.0369	0.0004	227	0.0057	0.000	0.001
3/26/03	0.001	0.0257	0.0002	248	0.0050	0.013	0.001
4/10/03	0.006	0.0557	0.0003	249	0.0040	0.015	0.001
4/24/03	0.006	0.0536	0.0002	244	0.0040	0.016	0.001
5/8/03	0.001	0.0592	0.0000	255	0.0040	0.000	0.001
5/21/03	0.001	0.0660	0.0005	289	0.0050	0.009	0.001
Mean	0.003	0.0495	0.0003	252	0.0046	0.009	0.001
Std. Dev.	0.003	0.0151	0.0002	20	0.0007	0.007	0.000
Upper Confidence Limit 95 Percent**	0.008	0.0825	0.0006	297	0.0062	0.025	0.001

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 5 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER
MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-2

Date	Fluoride mg/L	Iron mg/L	Lead mg/L	Manganese mg/L	Mercury µg/L	Nitrate as N mg/L
10/24/02	0.32	0.493	0.009	0.0380	0.03	0.019
3/26/03	0.32	0.149	0.007	0.0126	0.03	0.006
4/10/03	0.31	2.794	0.006	0.0352	0.03	0.003
4/24/03	0.28	3.338	0.009	0.0406	0.03	0.004
5/8/03	0.25	0.214	0.004	0.0163	0.03	0.077
5/21/03	0.24	1.023	0.003	0.0294	0.19	3.277
Mean	0.29	1.335	0.006	0.0287	0.06	0.564
Std. Dev.	0.04	1.386	0.003	0.0117	0.07	1.329
Upper Confidence Limit 95 Percent**	0.36	4.353	0.012	0.0541	0.20	3.457

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 5 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-2

Date	Radium 226 pCi/L	Radium 228 pCi/L	Selenium mg/L	Silver mg/L	Sulfate mg/L	TDS mg/L	pH
10/24/02	1.50	1.10	0.014	BDL*	563	1492	7.3
3/26/03	0.70	0.90	0.010	BDL*	592	1570	7.2
4/10/03	1.70	1.50	0.004	BDL*	552	1588	7.2
4/24/03	1.10	0.80	0.007	BDL*	619	2110	7.2
5/8/03	1.00	1.20	0.000	BDL*	568	1809	7.2
5/21/03	0.70	1.90	0.013	BDL*	640	2012	7.2
Mean	1.12	1.23	0.008		589	1764	7.2
Std. Dev.	0.41	0.41	0.005		35	255	0.0
Upper Confidence Limit 95 Percent**	2.01	2.12	0.020		664	2319	7.3

*Below detection limit. Silver reporting limit is 0.0003 mg/L. No upper confidence limit can be calculated.

**One tailed t value was used in the calculation of the upper level 95 percent confidence limit except for pH where a two tailed t value was used.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 6

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-3

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Alachlor	0.01	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Aldicarb	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Atrazine	0.01	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Benzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Carbofuran	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Carbon Tetrachloride	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Chlordane	0.30	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Endrin	0.07	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Heptachlor	0.07	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Heptachlor Epoxide	0.05	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Lindane (Gamma-Hexachloro Cyclohexane)	0.05	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
2,4-D	2.5	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
ortho-Dichlorobenzene	4	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
para-Dichlorobenzene	4	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,2-Dichloroethane	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,1-Dichloroethylene	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
trans 1,2-Dichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,2-Dichloropropane	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Ethylbenzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Methoxychlor	0.1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Monochlorobenzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Pentachlorophenol	50	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Polychlorinated Biphenyls (PCBs) (as decachloro-biphenyl)	0.3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 6 (Continued)

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-3

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Styrene	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
2,4,5-TP (Silvex)	0.5	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Tetrachloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Toluene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Toxaphene	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,1,1-Trichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Trichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Vinyl Chloride	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Ortho Xylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Xylenes	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
BETX	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*

*Below detection limits. No upper confidence limit can be calculated.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 7

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-3

Date	Arsenic mg/L	Barium mg/L	Cadmium mg/L	Chloride mg/L	Chromium mg/L	Copper mg/L	Cyanide mg/L
10/24/02	BDL*	0.0359	0.0001	158	0.002	0.001	0.001
3/26/03	BDL*	0.0825	0.0003	148	0.005	0.018	0.001
4/10/03	BDL*	0.0530	0.0001	132	0.005	0.015	0.001
4/24/03	BDL*	0.0544	0.0001	143	0.003	0.012	0.001
5/8/03	BDL*	0.0637	0.0001	143	0.005	0.001	0.001
5/21/03	BDL*	0.1048	0.0005	160	0.004	0.005	0.001
Mean		0.0657	0.0002	147	0.004	0.009	0.001
Std. Dev.		0.0245	0.0002	10	0.001	0.007	0.000
Upper Confidence Limit 95 Percent**		0.1190	0.0006	170	0.007	0.025	0.001

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 7 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-3

Date	Fluoride mg/L	Iron mg/L	Lead mg/L	Manganese mg/L	Mercury µg/L	Nitrate as N mg/L
10/24/02	0.31	1.350	0.009	0.1034	0.03	0.027
3/26/03	0.39	20.644	0.009	0.0770	0.03	0.026
4/10/03	0.26	4.893	0.008	0.0781	0.03	0.003
4/24/03	0.29	9.344	0.008	0.0967	0.03	0.003
5/8/03	0.25	13.233	0.007	0.1189	0.03	0.019
5/21/03	0.28	22.769	0.007	0.1914	0.07	0.006
Mean	0.30	12.039	0.008	0.1109	0.04	0.014
Std. Dev.	0.05	8.523	0.001	0.0425	0.02	0.011
Upper Confidence Limit 95 Percent**	0.41	30.588	0.010	0.2034	0.07	0.039

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 7 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-3

Date	Radium 226 pCi/L	Radium 228 pCi/L	Selenium mg/L	Silver mg/L	Sulfate mg/L	TDS mg/L	pH
10/24/02	0.70	0.20	0.012	BDL*	172	903	7.3
3/26/03	1.10	0.90	0.007	BDL*	169	860	7.3
4/10/03	1.70	0.90	0.011	BDL*	158	1124	7.4
4/24/03	1.00	0.80	0.007	BDL*	204	1172	7.4
5/8/03	0.90	1.00	0.001	BDL*	181	986	7.2
5/21/03	0.70	1.90	0.010	BDL*	170	1064	7.3
Mean	1.02	0.95	0.008		176	1018	7.3
Std. Dev.	0.37	0.55	0.004		16	124	0.1
Upper Confidence Limit 95 Percent**	1.82	2.14	0.017		210	1287	7.5

*Below detection limit. Arsenic reporting limit is 0.001 mg/L and silver reporting limit is 0.0003 mg/L. No upper confidence limit can be calculated.

**One tailed t value was used in the calculation of the upper level 95 percent confidence limit except for pH where a two tailed t value was used.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 8

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-4

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Alachlor	0.01	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Aldicarb	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Atrazine	0.01	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Benzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Carbofuran	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Carbon Tetrachloride	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Chlordane	0.30	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Endrin	0.07	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Heptachlor	0.07	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Heptachlor Epoxide	0.05	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Lindane (Gamma-Hexachloro Cyclohexane)	0.05	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
2,4-D	2.5	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
ortho-Dichlorobenzene	4	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
para-Dichlorobenzene	4	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,2-Dichloroethane	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,1-Dichloroethylene	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
trans 1,2-Dichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,2-Dichloropropane	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Ethylbenzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Methoxychlor	0.1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Monochlorobenzene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Pentachlorophenol	50	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Polychlorinated Biphenyls (PCBs) (as decachloro-biphenyl)	0.3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 8 (Continued)

ORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-4

Constituent (µg/L)	Reporting Limit	Date					
		10/24/02	3/26/03	4/10/03	4/24/03	5/8/03	5/21/03
Styrene	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
2,4,5-TP (Silvex)	0.5	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Tetrachloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Toluene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Toxaphene	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
1,1,1-Trichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Trichloroethylene	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Vinyl Chloride	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Ortho Xylenes	2	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
Xylenes	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*
BETX	1	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*

*Below detection limits. No upper confidence limit can be calculated.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 9

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL OT-4

Date	Arsenic mg/L	Barium mg/L	Cadmium mg/L	Chloride mg/L	Chromium mg/L	Copper mg/L	Cyanide mg/L
10/24/02	BDL*	0.0747	0.0001	556	0.0024	0.001	0.001
3/26/03	BDL*	0.0810	0.0010	406	0.1010	0.094	0.001
4/10/03	BDL*	0.1104	0.0002	398	0.0040	0.025	0.001
4/24/03	BDL*	0.1070	0.0001	399	0.0040	0.022	0.001
5/8/03	BDL*	0.1161	0.0001	165	0.0030	0.001	0.001
5/21/03	BDL*	0.0582	0.0006	429	0.0040	0.007	0.001
Mean		0.0912	0.0004	392	0.0197	0.025	0.001
Std. Dev.		0.0233	0.0004	127	0.0398	0.035	0.000
Upper Confidence Limit 95 Percent**		0.1418	0.0012	668	0.1064	0.102	0.001

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 9 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-4

Date	Fluoride mg/L	Iron mg/L	Lead mg/L	Manganese mg/L	Mercury µg/L	Nitrate as N mg/L
10/24/02	0.33	2.164	0.009	0.1393	0.03	0.003
3/26/03	0.33	2.731	0.028	0.1008	0.07	0.013
4/10/03	0.30	17.572	0.009	0.1478	0.03	0.003
4/24/03	0.30	17.544	0.010	0.1624	0.03	0.003
5/8/03	0.26	22.285	0.006	0.1990	0.03	0.004
5/21/03	0.28	30.343	0.006	0.1949	0.03	0.005
Mean	0.30	15.440	0.011	0.1574	0.04	0.005
Std. Dev.	0.03	11.097	0.008	0.0368	0.02	0.004
Upper Confidence Limit 95 Percent**	0.36	39.591	0.029	0.2375	0.07	0.014

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 9 (Continued)

INORGANIC CONSTITUENTS IN THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS BACKGROUND STUDY - MONITORING WELL QT-4

Date	Radium 226 pCi/L	Radium 228 pCi/L	Selenium mg/L	Silver mg/L	Sulfate mg/L	TDS mg/L	pH
10/24/02	2.50	1.80	0.009	0.0001	268	1556	6.8
3/26/03	2.10	2.40	0.009	0.0052	260	1582	7.4
4/10/03	2.70	1.30	0.001	0.0001	253	1486	7.2
4/24/03	2.90	1.40	0.001	0.0001	281	1784	7.2
5/8/03	1.40	2.40	0.003	0.0001	280	1594	7.3
5/21/03	1.90	2.20	0.001	0.0001	257	1524	7.2
Mean	2.25	1.92	0.004	0.0010	267	1588	7.2
Std. Dev.	0.56	0.49	0.004	0.0021	12	104	0.2
Upper Confidence Limit 95 Percent**	3.46	2.99	0.013	0.0055	292	1814	7.8

*Below detection limit. Arsenic reporting limit is 0.001 mg/L. No upper confidence limit can be calculated.

**One tailed t value was used in the calculation of the upper level 95 percent confidence limit except for pH where a two tailed t value was used.

and QT-4 are below detection limits except for trichloroethylene in well QT-1 (see Table 2), where the upper 95 percent confidence limit is 2 µg/L. As for the inorganic constituents, the upper 95 percent confidence limits of all the parameters are given at the bottom of Tables 3, 5, 7, and 9 respectively, for all four monitoring wells QT-1, QT-2, QT-3, and QT-4.

Groundwater Elevation Data and Flow Direction

Table 10 presents the groundwater elevation data for each of the four monitoring wells on the six sampling days. The data indicates that well QT-4 has the highest groundwater level and well QT-2 has the lowest groundwater level. However, wells QT-1 and QT-3 have groundwater levels almost as low as well QT-2.

There are several circumstances that make the groundwater elevation data non-representational of the groundwater surface continuum in this general area. The bottom of the reservoir is at elevation -210 feet, CCD and the invert of the inlet/outlet tunnel in the northeast corner of the reservoir is at elevation -245 feet, CCD. Thus, both the reservoir bottom and the invert of the inlet/outlet tunnel are below the surface of the groundwater in each of the four monitoring wells.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 10

WATER LEVEL ELEVATIONS FOR THE THORNTON TRANSITIONAL RESERVOIR GROUNDWATER MONITORING WELLS

Date	Elevation in Feet Relative to CCD*			
	QT-1	QT-2	QT-3	QT-4
10/24/02	-169.3	-195.7	-186.6	-97.2
3/26/03	-170.1	-186.5	-186.7	-97.2
4/10/03	-169.7	-199.0	-193.4	-96.7
4/24/03	-169.7	-199.8	-187.0	-98.2
5/8/03	-165.7	-197.1	-184.9	-96.7
5/21/03	-163.1	-198.4	-182.9	-96.2

*Chicago City Datum.

Each well is in close proximity of the reservoir and this may result in local disturbances and/or groundwater drawdown effects in each well.

The groundwater surface in well QT-4 varies over a range of 2.0 feet, from -98.2 to -96.2 feet, CCD. The groundwater surface in well QT-1 varies over a range of 7.0 feet, from -170.1 to -163.1. The groundwater surface in well QT-2 varies over a range of 13.3 feet, from -199.8 to -186.5. The groundwater surface in well QT-3 varies over a range of 10.5 feet, from -193.4 to -182.9. These variations in range and magnitude demonstrate a lack of consistency in the groundwater continuum.

The lowest groundwater surface measurement in each well does not occur on the same date, but occurs on three different dates between March 26 and April 24, 2003. The highest groundwater surface measurement in each well does occur on the same date, May 21, 2003, for three wells, QT-1, QT-3 and QT-4. In well QT-2, the highest groundwater surface measurement occurs on March 26, 2003.

The void in the rock mass caused by the reservoir results in a discontinuity in the groundwater continuum, thereby making it impossible to calculate a groundwater flux and

direction from the measurements in these four monitoring wells.

Location of the Monitoring Wells

Engineering quality drawings to scale are required to be submitted in the SOW to show the location of the monitoring wells. The drawings are Sheet Numbers F-4 and F-5 of Contract 77-235-CF. These drawings are not a part of this report, but will be submitted upon request. Monitoring well QT-1 is located on Sheet Number F-5 and wells QT-2, QT-3 and QT-4 are shown on Sheet Number F-4. For purposes of this report, the locations of the groundwater monitoring wells are shown on Figure 1.

APPENDIX AI

JUNE 26, 2001, SCOPE OF WORK (SOW) FOR GROUNDWATER QUALITY MONITORING FOR THE THORNTON TRANSITIONAL FLOOD CONTROL RESERVOIR, AND AUGUST 6, 2001 LETTER OF APPROVAL OF SOW FROM ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

Scope of Work
Groundwater Quality Monitoring
At Thornton Transitional Flood Control Reservoir
By
The Metropolitan Water Reclamation District of Greater Chicago
June 26, 2001

I. Purpose

The work to be competed under this project scope includes the collection and analysis of groundwater samples from four groundwater monitoring wells at the Thornton Transitional Reservoir. The purpose of this work is to provide baseline, background groundwater quality data at this site in order to allow for comparison and assessment of any possible contamination due to seepage produced during the operation of the flood control Reservoir.

This plan outlines the procedures for sampling and analysis of water from the groundwater monitoring wells constructed to monitor the bedrock around the reservoir. The approximate locations of the wells are shown in Figure 1.

2. Background

The Thornton Transitional Reservoir is in the West Lobe of Thornton Quarry, southeast of the intersection of the Tri-State Tollway and Halsted Street in Thornton, Illinois. The Thornton Transitional Reservoir is the final structural measure to be implemented for the Little Calumet River Watershed under the Natural Resources Conservation Service (NRCS) Little Calumet River Watershed Plan of November 1978. The Thornton Transitional Reservoir will provide 3.1 billion gallons of floodwater storage, which represents the capture of the 100-year storm event from Thorn Creek at a point just south of the Tri-State Tollway.

The project will provide flood control benefits for 21 businesses and 4,400 residences, for an average benefit of $6.8 million per year. Within the Little Calumet River watershed, the communities of Blue Island, Calumet City, Dixmoor, Dolton, Glenwood, Harvey, Lansing, Phoenix, Riverdale, and South Holland will receive flood control benefits.

The Thornton Transitional Reservoir consists of a diversion structure at Thorn Creek, a 24-foot diameter dropshaft, and 22-foot diameter conveyance tunnel to the Lower West Lobe of Thornton Quarry. The project also includes an 8-foot diameter tunnel connected to the Calumet Tunnel and Reservoir Plan (TARP) System that will be utilized for Reservoir dewatering purposes only. The Thornton Transitional Reservoir will be completed by December 2002.

Due to its location at –210 CCD elevation within the Thornton Quarry, there is a hydrogeologic link to the surrounding bedrock aquifer. However, it is anticipated that

there is little potential for any seepage to result in groundwater contamination of the bedrock aquifer for the following reasons.

- Overflows from Thorn Creek to the Reservoir will commence after the Creek rises an average of approximately 10 feet. Due to this, the first flush of stormwater runoff, which may contain higher concentrations of contaminants, will not flow to the Reservoir.
- According to a March 1996 Report by Patrick Engineering Inc., the gradient of groundwater flow shows that flow from all directions is to the quarry.

Monitoring wells will be installed at the site (Figure 1) in order to provide background water quality data and evaluate any potential impacts from the Reservoir during storm events. The monitoring wells will not exceed distance of 15 feet from the bottom of the impoundment. They will also be similar to those installed under current District TARP contracts (Figure 2).

A review of the March 1996 Report by Patrick Engineering Inc. indicates that "all municipalities within the field verification area purchase their potable water supplies from either the City of Chicago or the City of Hammond. Residents may continue to use private wells in all communities for non-domestic purposes such as lawn watering and automobile washing." The report consisted of a groundwater well survey covering the area around the Reservoir out to between 3,000 and 10,000 feet from the Reservoir. No potable water wells being currently used for drinking water purposes were identified within a 2,500-foot distance from the Reservoir.

3. References

The following documents and publications are cited as references in this plan:

a. Chicago District, U. S. Army Corps of Engineers Permit File Number 200000202, dated September 20, 2000, issued to the Metropolitan Water Reclamation District of Greater Chicago to Construct the Thornton Transitional Reservoir.

b. IEPA, Section 401 Certification, dated September 1, 2000, issued to the Chicago District, U. S. Army Corps of Engineers as part of Permit File Number 200000202.

c. Patrick Engineering Inc., CUP-Thornton Reservoir Water Well and Survey Monumentation Inventory Report, March 1996

c. MWRDGC, December 28,1995 Inter Office Memorandum from Special Operations Section to Supervisor of Field Operations, Subject: Sampling Protocol for Groundwater Monitoring Wells, MWRDGC Industrial Waste Control Division.

d. (1992) American Water Works Association, Standard Methods for the Examination of Water and Waste Water 18th Edition

e. (1985) American Water Works Association, Standard Methods for the Examination of Water and Waste Water 16th Edition

f. (1986 or Revisions) United States Environmental Protection Agency, SW846, Test Methods for Evaluating Solid Wastes

4. Sampling Procedures

Reservoir Monitoring Well

To be consistent with the in-place deep tunnel monitoring well protocol, the District's Industrial Waste Division's well sampling protocol procedures will be used to monitor the Thornton Transitional Reservoir wells. The well monitoring protocol is as follows:

a. Chlorinate all new wells, or wells that have undergone repairs according to MWRDGC procedure (See below for detailed chlorination procedures).

b. Brush off any dirt, debris, snow, water, etc. from the cover of the well casing.

c. Unlock and open the well cover.

d. Take an instantaneous reading of the well water level by lowering the depth probe from the portable water level sensing meter down the well casing. Water levels should be recorded to the top of the outer well casing.

e. Calculate the volume of water within the well utilizing the data obtained in step d. The purge volume on wells that recharge quickly is 150% of the well volume. On wells that recharge slowly, 90% of the well volume is purged the first day, and 75% of the well volume is purged 48 hours later.

f. Calculate the purge volume utilizing the data obtained in step e.

g. To purge, attach a 3/4" hose to the discharge pipe in the well casing; attach a water meter on the end of this hose.

h. Attach the power cord from the generator to the well connection.

i. Start generator and activate the power switch. Pumping speed is controlled using the control knob on the converter box.

j. Monitor the water meter on the discharge hose, and deactivate the pump immediately when the predetermined purge volume is reached. Until the Reservoir goes on-line, the purge water may be discharged onto the ground.

k. (Slow recharges only) After the correct purge volume has been pumped from the well, the power cord and hose are disconnected and a final water level reading of the well water is taken.

l. Sampling. After the calculated purge volume is reached, samples are filled from the discharge end of the water meter. Required containers, preservatives, and holding times for the samples are listed in Table 2. Bottles should be filled and preserved in accordance to the applicable procedures outlined in USEPA SW-846 and Standard Methods for the Examination of Water and Waste Water 16th and 18th editions.

m. Immediately following collection, the temperature of the sample is taken from the gallon bottle for analysis of BOD, TDS, sulfate, and ammonia nitrogen. The temperature is measured with two dial-stem thermometers to double check the accuracy of the temperatures.

n. Following checking the temperature of the sample, the pH of the sample is taken on site using a separate portable pH meter.

o. Samples are then placed in a cooler, packed with sufficient ice to maintain the samples at 40 °C, and delivered to a certified laboratory for analysis.

p. Secure the well cover.

Monitoring Well Chlorination Procedures

Chlorination of the monitoring wells is performed to eliminate any contamination that might have entered the well when the pump and its equipment are installed or repaired. The chlorine requirement for disinfection of a given effluent is the amount of chlorine that must be added per unit volume of water, to produce the desired residual chlorine concentration after a definite contact time. The volume of water in the well is calculated from the depth reading. Then 15% sodium hypochlorite is added to the well with a ration of one part of chlorine to 1,500 parts water. The chlorine is poured down the depth measuring pipe of the well. The pipe is then flushed with a half gallon of distilled water. This forces the chlorine out of the pipe and into the well. The chlorine is circulated in the well, pump, and discharge pipe by switching on the pump for a minute or two. The pump is then switched off and the chlorine is allowed to sit in the well for at least 24 hours. After 24 hours, the well is purged of 90% of the current volume in the well. During pumping, the discharge is tested every 5-10 minutes with potassium iodine starch test paper. If the white paper strips turn purple, there is chlorine in the well. If chlorine is present in the well at any time during pumping, the crew must return on another day and purge the well again. This procedure continues until there is no indication of chlorine residual in the well. This may take from one to several days. After the well is purged clean of chlorine, the regular sampling schedule for the well is continued. Only the monitoring wells are chlorinated, not the observation wells.

The 3/4 inch hoses and water meters are also chlorinated with the same ratio of chlorine to water used in the wells. A chlorine/water solution is mixed in a three-gallon

bucket and then poured down the hose and through the connected water meter. The hose is then attached to a water faucet and flushed with clean water for about 15 minutes.

5. Sampling Frequency

For twelve months prior to the Reservoir going on-line, samples shall be collected approximately every two months from the groundwater monitoring wells for background data collection. The first of these samples shall be collected before the end of December 2001. These samples will be used to obtain a statistically valid representation of background water quality in the aquifer using the method specified in Attachment I. This method should be used to determine the upper 95 % confidence limit for each parameter listed in Table I. After such time, quarterly sampling should continue for the indicator parameters listed in Table II, until one year after the flood control facility is in operation.

After the Reservoir goes on-line event based monitoring shall be conducted for the indicator parameters in Table II on a weekly basis while floodwater is stored in the Reservoir. This will include grab sampling of floodwater stored in the Reservoir, in addition to samples collected from the groundwater monitoring wells

During the storage of floodwater in the Reservoir, if an analysis of samples collected from the groundwater monitoring wells shows an increase above the 95 % confidence limit of any of the indicator parameters in Table II, the parameters list shall be expanded to include all the parameters in Table I and weekly sampling shall continue until the concentrations of all parameters in Table I are below the 95 % confidence limit.

6. Methods of Analysis

Target Parameters

Field measurements shall be made of temperature and pH. Methods of analysis used shall be from *Standard Methods for the Examination of Water and Wastewater (1985 or 1.992)* or from SW-846, *Test Methods for Evaluating Solid Wastes (1986).*

Requirements for Laboratory Analysis

Sample analysis shall be performed within holding times required by each method. The laboratory shall perform the QA/QC procedures as required by the respective test methods.

The laboratory may substitute a different, appropriate method for analysis of these parameters from either SW-846 or *Standard Methods for the Examination of Water and*

Wastewater, provided that the required detection limits are still met. IEPA must approve any changes in analysis method.

Temperature, pH, and chromium (total) shall be taken from unfiltered samples. All other analyses will be performed on samples filtered through a 0.45 4m membrane. Filtering will be performed in the laboratory.

Quality Assurance/Quality Control

Each batch of samples to be analyzed shall include method blanks, matrix spikes, and matrix spike duplicates, surrogate spikes, and laboratory control samples. All of these results must be reported along with sample results and all laboratory-generated QA/QC acceptance criteria such as precision and accuracy limits.

7. Reporting Requirements

A background groundwater quality report shall be generated and submitted to the IEPA Compliance Assurance Section. The report shall contain the chemical analysis results of all 6 bi-monthly background groundwater sampling events completed prior to Reservoir flood control utilization.

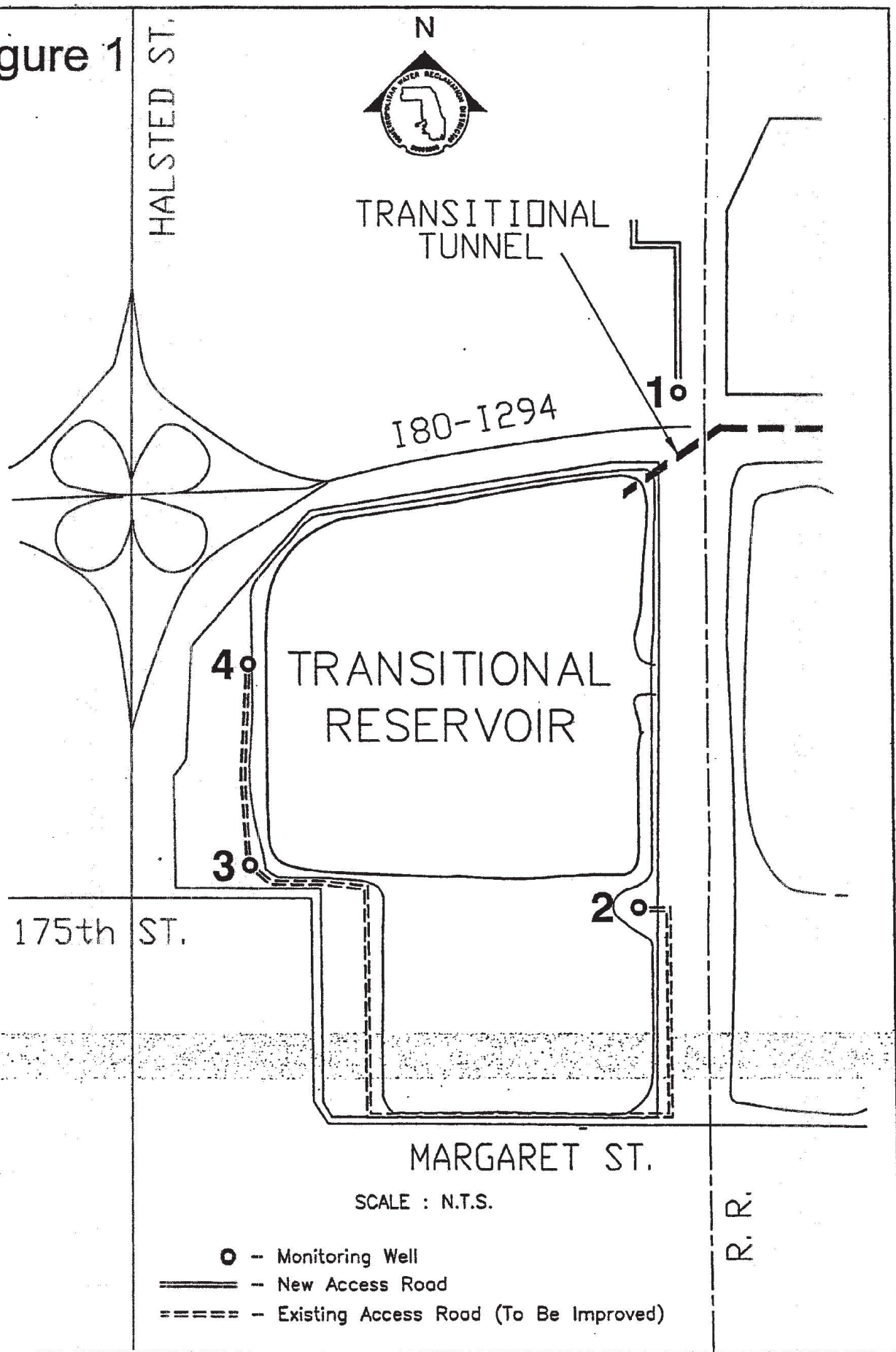
The report shall include:

1. Narrative project description and field work
2. All laboratory analytical data and QA/QC results
3. Engineering quality drawings to scale indicating the location of the monitoring wells
4. Groundwater elevation data, including a calculation of groundwater flow direction
5. Chain of Custody sheets, and field notes
6. The background statistical analysis for each well
7. Any other pertinent information required by IEPA

For the background groundwater quality program, the District will submit a report documenting the laboratory analyses to IEPA.

Annual Reservoir flood control utilization monitoring reports shall be submitted to IEPA Compliance Assurance Section. The reports shall contain the years monitoring wells sample analysis results and Reservoir contents grab sample analysis results, with a detailed review and comparison of the monitoring well sampling analysis results, utilizing the monitoring well statistical background determinations.

Figure 1



THORNTON TRANSITIONAL RESERVOIR
MONITORING WELLS

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO
ENGINEERING DEPARTMENT
02-23-01 FLOOD CONTROL JS:PFD

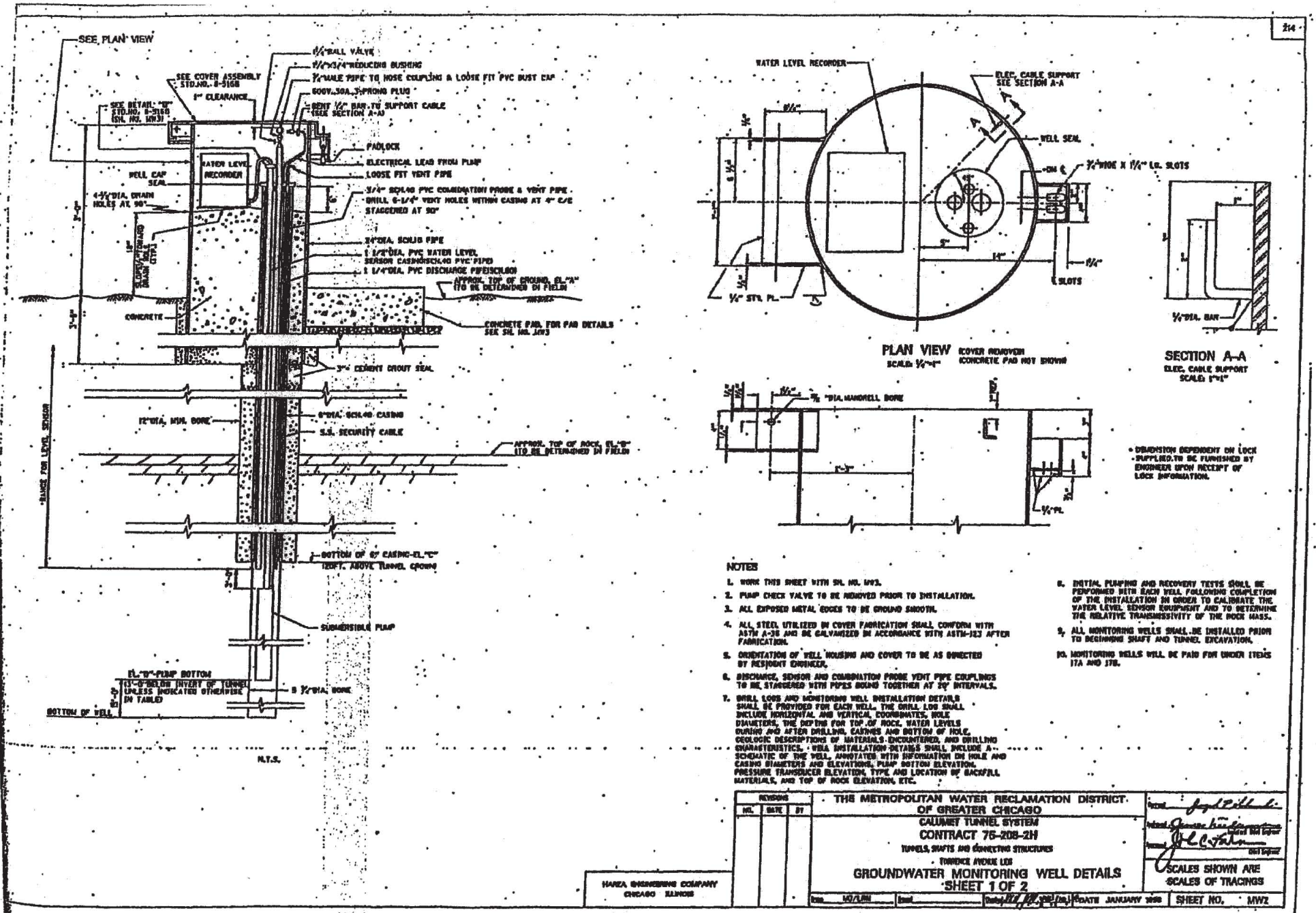


Figure 2. Typical Groundwater Monitoring Well Detail.

ATTACHMENT 1

A. This method should be used to predict the confidence limit when single groundwater samples are taken from <u>each</u> monitoring (test) well.

1. Determine the arithmetic mean ($\bar{X}_b$) of each indicator parameter for the background sampling period. If more than one background (upgradient) well is used, an equal number of samples must be taken from each well.

$$\bar{X}_b = \frac{X_1 + X_2 + \ldots + X_n}{n}$$

Where:

$\bar{X}_b$ = Average background value for a given chemical parameter
X_n = Background values for each upgradient sample
n = the number of background samples taken

2. Calculate the background variance (S_b^2) and standard deviation (S_b) for each parameter using the values (X_n) from each background sample of the upgradient well(s) as follows:

$$S_b^2 = \frac{(X_1 - \bar{X}_b)^2 + (X_2 - \bar{X}_b)^2 + \ldots + (X_n - \bar{X}_b)^2}{n-1}$$

$$S_b = \sqrt{S_b^2}$$

3. Calculate the upper confidence limit using the following formula:

$$CL = \bar{X}_b \pm t\sqrt{1 + 1/n}\ (S_b)$$

Where:

CL = upper confidence limit prediction
(upper and lower limits should be calculated for pH)
t = one-tailed t value at the required significance level and at n-1 degrees of freedom from Table 1
(a two-tailed t value should be used for pH)

4. If the values of any routine parameter for any monitoring well exceeds the upper confidence limit for that parameter, the permittee shall conclude that a statistically significant change has occurred at that well.

5. When some of the background (upgradient) values are less than the Method Detection Limit (MDL), a value of one-half (1/2) the MDL shall be substituted for each background value that is reported as less than the MDL. All other computations shall be calculated as given above.

B. If all the background (upgradient) values are less than the MDL for a given parameter, the Practical Quantitation Limit (PQL), as given in 35 Ill. Adm. Code Part 724 Appendix I shall be used to evaluate data from monitoring wells. If the analytical results from any monitoring well exceeds two (2) times the PQL for any single parameter, or if they exceed the PQLs for two or more parameters, the permittee shall conclude that a statistically significant change has occurred.

Table 1
Standard T-Tables Level of Significance

Degrees of freedom	t-values (one-tail)		t-values (two-tail)*	
	99%	95%	99%	95%
4	3.747	2.132	4.604	2.776
5	3.365	2.015	4.032	2.571
6	3.143	1.943	3.707	2.447
7	2.998	1.895	3.499	2.365
8	2.896	1.860	3.355	2.306
9	2.821	1.833	3.250	2.262
10	2.764	1.812	3.169	2.228
11	2.718	1.796	3.106	2.201
12	2.681	1.782	3.055	2.179
13	2.650	1.771	3.012	2.160
14	2.624	1.761	2.977	2.145
15	2.602	1.753	2.947	2.131
16	2.583	1.746	2.921	2.120
17	2.567	1.740	2.898	2.110
18	2.552	1.734	2.878	2.101
19	2.539	1.729	2.861	2.093
20	2.528	1.725	2.845	2.086
21	2.518	1.721	2.831	2.080
22	2.508	1.717	2.819	2.074
23	2.500	1.714	2.807	2.069
24	2.492	1.711	2.797	2.064
25	2.485	1.708	2.787	2.060
30	2.457	1.697	2.750	2.042
40	2.423	1.684	2.704	2.021

Adopted from Table III of "Statistical Tables for Biological Agricultural and Medical Research" (1947. R.A. Fisher and F. Yates).

* For pH only when required.

Table I

Groundwater Quality Standards for Class I:

Potable Resource Groundwater

Inorganic Chemical Constituents

Constituent	Constituent
Arsenic	Manganese
Barium	Mercury
Cadmium	Nitrate as N
Chloride	Radium-226
Chromium	Radium-228
Copper	Selenium
Cyanide	Silver
Fluoride	Sulfate
Iron	Total Dissolved
Lead	Solids (TDS)
	pH

Organic Chemical Constituents

Alachlor	1,2-Dichloropropane*
Aldicarb	Ethylbenzene
Atrazine	Methoxychlor
Benzene*	Monochlorobenzene
Carbofuran	Pentachlorophenol*
Carbon Tetrachloride*	Polychlorinated
Chlordane*	Biphenyls (PCB's)
Endrin	(as decachloro-biphenyl)*
Heptachlor*	Styrene
Heptachlor Epoxide*	2,4,5-TP (Silvex)
Lindane (Gamma-Hexachloro	Tetrachloroethylene*
cyclohexane)	Toluene
2,4-D	Toxaphene*
ortho-Dichlorbenzene	1,1,1-Trichloroethane
para-Dichlorbenzene	Trichloroethylene*
1,2-Dichloroethane*	Vinyl Chloride*
1,1-Dichlorethylene	Xylenes
trans-1,2-Dichloroethylene	

Complex Organic Chemical Mixtures

Benzene*
BETX

*Denotes a carcinogen

Table1.lst

TABLE II

Constituents Typically Found in Stormwater

Arsenic	Ammonia
Boron	Barium
Chloride	Cadmium
Copper	Chromium
Fecal Coliform	Cyanide
Iron	Fluoride
Lead	Manganese
Mercury	Nickel
Phenols	Silver
Sulfate	Temperature
Total Dissolved Solids	Nitrate

Biochemical Oxygen Demand (5-day and 21-day)

cc: JSJ 11-26-03 DM

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

August 6, 2001

Joseph Zurad, Chief Engineer
Metropolitan Water Reclamation District of Greater Chicago
101 East Erie Street
Chicago, IL 60611-2803

Re: Thornton Transitional Flood Control Reservoir
IEPA Log # C-1539-99 (USACOE # 200000202)

Dear Mr. Zurad:

The Illinois Environmental Protection Agency (Illinois EPA) has completed its review of the revised Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Groundwater Quality Well Installation and Monitoring Plan (Plan) for the project noted above, dated June 26, 2001. The well installation portion of the Plan, dated April 16, 2001, was reviewed with the updated Plan.

The Illinois EPA approves the Plan for the Thornton transitional flood control reservoir.

Should you have any further questions or would like to discuss the information above, contact Carl Kamp at 217-785-4787.

Sincerely,

Signature on file

Toby Frevert
Manager
Division of Water Pollution Control
Bureau of Water

APPENDIX AII

ANALYTICAL METHODS USED TO ANALYZE THE GROUNDWATER SAMPLES

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-1

LIST OF ANALYTICAL METHODS USED BY THE STICKNEY WRP LABORATORY*

Parameter	Method Reference
Arsenic	Standard Methods 3120 B
Barium	Standard Methods 3120 B
Cadmium	Standard Methods 3120 B
Chloride	Standard Methods 4500 Cl D
Chromium	Standard Methods 3120 B
Copper	Standard Methods 3120 B
Cyanide	Standard Methods 4500-CN C
Fluoride	EPA Method 340.2
Iron	Standard Methods 3120 B
Lead	Standard Methods 3120 B
Manganese	Standard Methods 3120 B
Nickel	Standard Methods 3120 B
Mercury	Standard Methods 3120 B
Nitrate-Nitrogen	EPA Method 353.2
Selenium	Standard Methods 3120 B
Sulfate**	EPA Method 375.4
Total Dissolved Solids	Standard Methods 2540 C
pH	Standard Methods 4500 H B
Radium-226***	EPA Method 503.1
Radium-228***	RA-05

*National Environmental Laboratory Accreditation Conference (NELAC) accreditation number is 100340.

**Analyzed at the Calumet WRP Laboratory. NELAC accreditation number is 100338.

***Samples analyzed by US Biosystems. NELAC accreditation number is 200020.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-2

LIST OF ANALYTICAL METHODS USED BY THE EGAN WRP LABORATORY*

Parameter	Method Reference
Alachlor**	EPA Method 525.2
Aldicarb**	EPA Method 531.1
Atrazine**	EPA Method 525.2
Benzene	EPA Method 624
Carbofuran**	EPA Method 531.1
Carbon Tetrachloride	EPA Method 624
Chlordane	EPA Method 608
Endrin	EPA Method 608
Heptachlor	EPA Method 608
Heptachlor Epoxide	EPA Method 608
Lindane	EPA Method 608
2,4-D	Standard Methods 6640 B
Ortho Dichlorobenzene	EPA Method 625
Para Dichlorobenzene	EPA Method 625
1,2 Dichloroethane	EPA Method 624
1,1 Dichloroethylene	EPA Method 624
Trans 1,2 Dichloroethylene	EPA Method 624
1,2 Dichloropropane	EPA Method 624
Ethylbenzene	EPA Method 624
Methoxychlor	EPA Method 608
Monochlorobenzene	EPA Method 624
Pentachlorophenol	EPA Method 625
PCB	EPA Method 608
Styrene	EPA Method 624
2,4,5-TP	Standard Methods 6640 B
Tetrachloroethylene	EPA Method 624
Toluene	EPA Method 624
Toxaphene	EPA Method 608
1,1,1 Trichloroethylene	EPA Method 624
Trichloroethylene	EPA Method 624
Vinyl Chloride	EPA Method 624
Ortho Xylene	EPA Method 624
Xylenes	EPA Method 624

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-2 (Continued)

LIST OF ANALYTICAL METHODS USED BY THE EGAN WRP LABORATORY*

Parameter	Method Reference
Benzene	EPA Method 624
BETX	EPA Method 624

*National Environmental Laboratory Accreditation Conference (NELAC) accreditation number is 000745.

**Samples analyzed by US Biosystems. NELAC accreditation number is 200020.

APPENDIX AIII

CHAIN-OF-CUSTODY FORMS

ANALYTICAL MONITORING
FIELD LOG SHEET

CREW: THIGPEN-SKIPTON
MAN HOURS: 16
WEATHER: CLDY / RAIN 40

DATE: 10-24-02
TRUCK: 1732 FINAL MI:
GENERATOR: ~~GT #7~~ FINAL HRS:

SYSTEM & WELL #	ARRIVE DEPART	ACTIVITY	INITIAL ELEV.	INITIAL VOL.	PURGE VOL.	FINAL ELEV.	pH	TEMP C	MHOS	LAB REC.	TIME OF SAMPLE	WATER METER	REMARKS:	
T#1	1245	D-II-S (75%)	218'7" (286) (446)	~~1988~~ 110 GALS	83 GALS	265'	7.0	11.7	1955	3758539 ~~3758586~~	1320	3939 110 4049		V
T#2	1110 1135	D-II-S (75%)	253'6" 293'	66 GALS	49 GALS	256'	7.0	12.8	1205	3758257 ~~3758471~~	1130	3716 49 3765		V
T#3	1140 1205	D-II-S (75%)	242'8" 291'	64 GALS	48 GALS	264	6.0	11.1	950	3758264 ~~3758496~~	1200	3769 48 3817	19 GAL SPIKE OF PURGE VOLUME	V
T#4	1210 1230	D-II-S (75%)	151' 290'	~~188~~ GALS	141 GALS	256'7"	7.0	12.3	1788	3758269 ~~3758502~~	1225	3798 141 3939		V

ACTIVITIES: D-I = 90% VOLUME PURGED, D-II = 75% VOLUME PURGED, D-I-II = 165% VOLUME PURGED, S = SAMPLE TAKEN

ANALYTICAL MONITORING
FIELD LOG SHEET

CREW: THIGPEN - SKIPTON
MAN HOURS: 16
WEATHER: CLEAR - 40's

DATE: 3-26-03
TRUCK: 1732 FINAL MI:
GENERATOR: GT#4 FINAL HRS:

SYSTEM & WELL #	ARRIVE DEPART	ACTIVITY	INITIAL ELEV.	INITIAL VOL.	PURGE VOL.	FINAL ELEV.	pH	TEMP C	MHOS	LAB REC.	TIME OF SAMPLE	WATER METER	REMARKS:
THORN G.W. #1 SVOC-LAB	0900 1040	D-II-S (75%)	(3422) Z19.5'	88 GALS	66 GALS	(391) Z54'	7.0	12.9	1882	3918 117	1020	19853 66 19929	TOTAL ALIQUOTS 9
THORN QT#2	1055 1125	D-II-S (75%)	Z44'4" 243	66 GALS	49 GALS	Z47'7"	7.0	13.5	1498	3918 118	1120	19922 49 19971	9
THORN QT#3	1130 1205	D-II-S (75%)	Z42'9"	64 GALS	48 GALS	Z64'	7.0	11.7	952	3918 119	1200	19978 48 20026	9
THORN QT#4	1210	D-II-S (75%)	151'	188 GALS	141	Z57'6"	7.0	13.1	1678	3918 120	1240	20017 141 20158	9
												TOTAL ALIQUOTS	36 + 2 TRIP BLANKS

ACTIVITIES: D-I = 90% VOLUME PURGED, D-II = 75% VOLUME PURGED, D-I-II = 165% VOLUME PURGED, S = SAMPLE TAKEN

Relinquished by [signature] on 3/26/03 at 1420 Rec'd
received by [signature] 3/26/03

ANALYTICAL MONITORING
FIELD LOG SHEET

CREW: Thiglen-Skipton
MAN HOURS: 16
WEATHER: CLEAR - 40's

SWQC - LAB
03 APR 10 PM 2:10

DATE: 4-10-03
TRUCK: 1732 FINAL MI:
GENERATOR: GT#4 FINAL HRS:

SYSTEM & WELL #	ARRIVE DEPART	ACTIVITY	INITIAL ELEV.	INITIAL VOL.	PURGE VOL.	FINAL ELEV.	pH	TEMP C	MHOS	LAB REC.	TIME OF SAMPLE	WATER METER	REMARKS:
THORN #1	0930 1005	D-II-S	(342') 219'	87 GALS	65 GALS	(359') 247'	7.0	12.0	2030	3937 991	0955	20573 65 20638	TOTAL Aliquot 9
THORN #2	1015 1040	D-II-S	256'9"	48 GALS	36 GALS	257'7"	7.0	13.1	1565	3937 992	1035	20640 36 20676	9
THORN #3	1045 1110	D-II-S	249'6	55 GALS	41 GALS	264'	7.0	11.8	504	3937 993	1105	20678 41 20719	9 WELL DRY 29 GALS BEFORE PURGE VOLUME REACHED
THORN #4	1115	D-II-S	150'6"	188 GALS	141 GALS	210.5	7.0	13.3	1137	3937 994	1140	20690 141 20831	9 TOTAL ~~AMOUNT~~ SAMP 36 + 2 TRIP Blank

ACTIVITIES: D-I = 90% VOLUME PURGED, D-II = 75% VOLUME PURGED, D-I-II = 165% VOLUME PURGED, S = SAMPLE TAKEN

relinquished by [illegible] on 4/10/03 @ 1400
received by C. Rangel 4/10/03

CHAIN OF CUSTODY FORM

ANALYTICAL MONITORING
FIELD LOG SHEET

CREW: Foley- Farnan
DATE: 4-24-03

MAN HOURS: 16
TRUCK: 1630 FINAL MI:

WEATHER: Clear 50's
GENERATOR: QT2 FINAL HRS:

SWQC-LAB
03 APR 24 PM 1:54
RECEIVED
S.W.R.C.
OPERATIONS

Rec'd by K Villani 04/24/03 2400

SYSTEM & WELL #	ARRIVE/DEPART	ACTIVITY	INITIAL ELEV.	INITIAL VOL.	PURGE VOL.	FINAL ELEV.	pH	TEMP C	MHOS	LAB REC.	TIME OF SAMPLE	WATER METER	REMARKS:
QT 1	1115 — 1200	D-II-S 75%	X.64 (342) 219'0" 286	89 GAL	66 GAL	X.64 (411) 263'0"	7.2	12.8	708	3953114	1145	100 66 166	
QT 2	0915 — 0945	D-II-S 75%	257'7" 293	48 GAL	36 GAL	241'6"	7.2	11.1	930	3953119	0940	895 36 931	
QT 3	0955 — 1015	D-II-S 75%	243'2" 291	64 GAL	48 GAL	267'7"	7.4	11.7	466	3953128	1010	931 48 979	WELL RAN DRY AT 961
QT 4	1020 — 1100	D-II-S 75%	152'0" 290	185 GAL	139 GAL	258'0"	7.2	12.8	608	3953130	1055	961 139 1100	

ACTIVITIES: D-I = 90% VOLUME PURGED, D-II = 75% VOLUME PURGED, D-I-II = 165% VOLUME PURGED, S = SAMPLE TAKEN

ANALYTICAL MONITORING

FIELD LOG SHEET

CREW: Zintak / Skipton

DATE: 5/8/03

MAN HOURS:

TRUCK: 1954 FINAL MI:

WEATHER: Overcast 60's

GENERATOR: FINAL HRS:

SWBC LAB 03 MAY -8 PM 2:33 M.W.R.D. OF GR. CHGO

SYSTEM & WELL #	ARRIVE DEPART	ACTIVITY	INITIAL ELEV.	INITIAL VOL.	PURGE VOL.	FINAL ELEV.	pH	TEMP C	MHOS	LAB REC.	TIME OF SAMPLE	WATER METER	REMARKS:
QT-1	1145 / 1220	D-II-S 75%	X.64 336 215 (286)	95	71	X.64 400.6 257	7.28	13.1	678	3973894	1210	118666 71 128737	
QT-2	1010 / 1030	D-II-S 75%	254.10 (293)	51	38	255	7.12	13.5	1300	3973898	1015	118453 38 118491	
QT-3	1035 / 1100	D-II-S 75%	241 (291)	67	50	264.3	7.01	12.1	592	3973908	1040	118491 50 118541	
QT-4	1105 / 1130	D-II-S 75%	150.6 (290)	186	140	251.4	7.21	13.5	634	3973912	1110	118526 140 118666	

ACTIVITIES: D-I = 90% VOLUME PURGED, D-II = 75% VOLUME PURGED, D-I-II = 165% VOLUME PURGED, S = SAMPLE TAKEN

relinquished by D. Skipton 1415 received by: K Wallace 05/08/03

ANALYTICAL MONITORING
FIELD LOG SHEET

CREW: HARMAN / KIRKLAND
MAN HOURS: 16
WEATHER: SUNNY

DATE: 5-21-03
TRUCK: 1838 FINAL MI:
GENERATOR: GT-2 FINAL HRS:

THORNTON QUARRY

SYSTEM & WELL #	ARRIVE / DEPART	ACTIVITY	INITIAL ELEV.	INITIAL VOL.	PURGE VOL.	FINAL ELEV.	pH	TEMP C	MHOS	LAB REC.	TIME OF SAMPLE	WATER METER	REMARKS:
21 1	1200 / 1230	D-II-S 75%	X.64 (332) 212'5" (286)	98 GAL	74 GAL	X.64 (402) 257'3"	7.29	14.2°	2182	3992247	1210	120216 74 120290	
2T 2	0955 / 1035	D-II-S 75%	256'10" (293)	48 GAL	36 GAL	254'0"	6.88	14.1°	1801	3992248	1015	119991 36 120027	
QT 3	1040 / 1115	D-II-S 75%	239'0" (291)	70 GAL	53 GAL	237'0"	7.24	12.5°	1110	3992249	1050	120027 53 120080	WELL RAN 5 GALS SHORT AT 120075
QT 4	1120 / 1150	D-II-S 75%	150'0" (290)	188 GAL	141 GAL	26'12"	7.25	13.2°	1845	3992250	1130	120075 141 120216	

ACTIVITIES: D-I = 90% VOLUME PURGED, D-II = 75% VOLUME PURGED, D-I-II = 165% VOLUME PURGED, S = SAMPLE TAKEN

Rec'd K Villar 05/21/03 TIME 15.05

CHAIN OF CUSTODY RECORD

USBIOSYSTEMS

Log # 69020 / TN 4 Quote: _____

LAB USE ONLY	YES	NO	N/A
Samples INTACT upon arrival?			
Received ON WET ICE? Temp 3°	✓		
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIME?	✓		
CUSTODY SEALS INTACT?			
VOLATILES rec'd W/OUT HEADSPACE?	✓		
PROPER CONTAINERS used?	✓		

Company Name: MWRD PO#: 8001237

Address: 6001 W PERSHING

City: STICKNEY State: IL Zip:

Attn: DALE McDONALD Fax#:

Project Name: THORNTON QUARRY Proj#:

Sampler Name/Signature: [signature] Phone#: (708) 588 4132

	Sample ID	Date	Time	Matrix Code*	# of Containers	Preservative	RADIUM 226/228	METHOD 507	METHOD 531						
							1	1	1						
							A	A	A						
							B	B	B						
1	QT 1	10/24	1320	GW	4	1 GAL HDPE 1 LTR AMBER 2-HCL	X	X	X	1	AL	2	V		
2	QT 2	10/24	1130	GW	4	"	X	X	X						
3	QT 3	10/24	1200	GW	4	"	X	X	X						
4	QT 4	10/24	1225	GW	4	"	X	X	X						
5															
6															
7															
8															
9															
0															

Matrix Codes*

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SO	Soil Sediment
AFW	Analyte Free H_2O	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SU	Surface Water	O	Other (Please Specify)

Pres/Codes

A. None	G. $Na_2S_2O_3$
B. HNO_3	H. $NaHSO_4$
C. H_2SO_4	I. ICE
D. NaOH	J. MCAA
E. HCL	O. Other
F. MeOH	

REMARKS

METHOD 507 — RPT: Alachlor & Atrazine

METHOD 531 — RPT: Aldicarb & Carbofuran

Y/N | Date required | Y ___ N ✓ | None ✓ 1 ___ 2 ___ 3 ___ Other ___ | (Y) N | CP

___ ___	16	[signature]	10/24/02	2:55	MICHAEL J. KOHL	10/24/02	2:55 pm
___ ___	16-4	FEDEX CHICAGO-NJK	10/24/02	6:00 pm	FEDEX - NJK	10/24/02	6:00 pm
					[signature]	10/25/02	1230

#: _____

3231 N.W. 7th Avenue
Boca Raton, FL 33431
888-862-LABS
561-447-7373
888-456-4846 Fax
561-447-6136 Fax

C.O.C. # 44553

CHAIN OF CUSTODY FORM 7

CHAIN OF CUSTODY RECORD

USBIOSYSTEMS

Log # 74594 JJN9   Quote:

LAB USE ONLY (YES / NO / N/A)
- Samples INTACT upon arrival?
- Received ON WET ICE? Temp
- PROPER PRESERVATIVES indicated?
- Received WITHIN HOLDING TIME?
- CUSTODY SEALS INTACT?
- VOLATILES rec'd W/OUT HEADSPACE?
- PROPER CONTAINERS used?

Company Name: METRO. WATER RECLAIM. DIST. PO# 8001237
Address: 100 E ERIE ST
City: CHICAGO State: IL Zip: 60611
Attn: DAVE MacDONALD Fax#
Project Name: THORNTON QUARRY Proj#
Sampler Name/Signature: [signature] Phone# (708) 588 4132

LAB ANALYSIS — Parameters: B^I RADIO 226/228; A^I METHOD 507; F/I METHOD 531

	Sample ID	Date	Time	Matrix Code*	Containers	Sample Container	RADIO 226/228	METHOD 507	METHOD 531		REMARKS
1	QT #1	3/26	1020	GW	3A	1 GAL HDPE, 1 LTR AMB. GL, 2 ...	X	X	X	S/O	METHOD 507 -
2	QT # 2	3/26	1120	GW	3A	"	X	X	X		RPT - ALACHLOR
3	QT # 3	3/26	1200	GW	3A	"	X	X	X		ATRAZINE
4	QT # 4	3/26	1240	GW	3A	"	X	X	X		METHOD 531 -
5											ALDICARB
6											CARBOFURAN
7											
8											
9											
0											

N/A Special TPH; Integrity QC N/A

Matrix Codes*
SD Solid Waste; GW Ground Water; EFF Effluent; AFW Analyte Free H_2O; WW Waste Water; DW Drinking Water; SU Surface Water; OL Oil; SL Sludge; SO Soil Sediment; AQ Aqueous; NA Nonaqueous; PE Petroleum; O Other (Please Specify)

Pres/Codes
A. None; B. HNO_3; C. H_2SO_4; D. NaOH; E. HCL; F. MeOH; G. $Na_2S_2O_3$; H. $NaHSO_4$; I. ICE; J. MCAA; O. Other

Rush (Y/N) — Date required — Short Hold Y ___ N ✓ — QA/QC Report Level: None ✓ 1 ___ 2 ___ 3 ___ Other ___ — COC OK (Y) N — Initials CP

Coolers	Item	Relinquished by	Date	Time	Received by	Date	Time
	1/2	[signature]	3/26/03	1907	[signature]	3/26/03	1907
	1/2	USB CHICAGO-MJK	3/26/03	6:00pm	FEDX - MJK (CRC)	3/26/03	6:00pm
					CP [signature]	3/27/03	1300

Seals: # ___

3231 N.W. 7th Avenue
Boca Raton, FL 33431
888-862-LABS
561-447-7373
888-456-4846 Fax
561-447-6136 Fax

C.O.C. # 51416

USBIOSYSTEMS CHAIN OF CUSTODY FORM 8

LAB COPY

CHAIN OF CUSTODY RECORD

USBIOSYSTEMS

Log # 75291 ITN4 Quote: _____

LAB USE ONLY	YES	NO	N/A
Samples INTACT upon arrival?			
Received ON WET ICE? Temp____			
PROPER PRESERVATIVES indicated?			
Received WITHIN HOLDING TIME?			
CUSTODY SEALS INTACT?			
VOLATILES rec'd W/OUT HEADSPACE?			
PROPER CONTAINERS used?			

Company Name: MWRDGC PO#:

Address: 6001 N. PERSHING RD

City: CICERO State: IL Zip: 60804

Attn: DALE McDONALD Fax#: 708-588-4215

Project Name: THORNTON QUARRY Proj#: 7

Sampler Name/Signature: [signature] Phone#: 708 588-4132

	Sample ID	Date	Time	Matrix Code*	#	Container Type	Parameters: Radium 226/228	Method 507	Method 531
1	QT - 1	4/10	0930	GW	3	1-GAL PLAS 1-LTR AMB GC 1-40ML VOA	X	X	X
2	QT - 2	4/10	1035	GW	3	"	X	X	X
3	QT - 3	4/10	1105	GW	3	"	X	X	X
4	QT - 4	4/10	1140	GW	3	"	X	X	X
5									
6									
7									
8									
9									
0									

NO. OF CONTAINERS SUBMITTED: SD 10 1

Matrix Codes*

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SO	Soil Sediment
AFW	Analyte Free H_2O	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SU	Surface Water	O	Other ____ (Please Specify)

Pres/Codes

A. None	G. $Na_2S_2O_3$
B. HNO_3	H. $NaHSO_4$
C. H_2SO_4	I. ICE
D. NaOH	J. MCAA
E. HCL	O. Other
F. MeOH	

REMARKS

METHOD 507
RAT - ALACHLOR
ATRAZINE
METHOD 531
RAT - ALDICARB
CARBOFURAN

Y/N | Date required | Y____ N✓ | None✓ 1____ 2____ 3____ Other____ | (Y) N

____ ____	12	[signature]	4/10/03	2:15	[signature]	4/10/03	2:15
____ ____	12-12	USB CHICAGO - MJK	4/10/03	5:00pm	FEDEX - MJK	4/10/03	5:00pm
		FED EX	4/11/03	1400	[signature]	4/11/03	1400

____

3231 N.W. 7th Avenue
Boca Raton, FL 33431
888-862-LABS
561-447-7373
888-456-4846 Fax
561-447-6136 Fax

C.O.C. # 51519

CHAIN OF CUSTODY FORM 9

USBIOSYSTEMS

Log # 75746 ITN4 Quote: _____

Company Name	MWRDGC PO#
Address	5901 W PERSHING RD
City	STICKNEY State - IL Zip
Attn:	DALE McDONALD Fax#
Project Name	THORTON QUARRY Proj#
Sampler Name/Signature	JOHN FOLEY Phone#

Samples INTACT upon arrival?
Received ON WET ICE? Temp____
PROPER PRESERVATIVES indicated?
Received WITHIN HOLDING TIME?
CUSTODY SEALS INTACT?
VOLATILES rec'd W/OUT HEADSPACE?
PROPER CONTAINERS used?

Matrix Codes*

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SO	Soil Sediment
AFW	Analyte Free H_2O	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SU	Surface Water	O	Other ____ (Please Specify)

Pres/Codes

A. None	G. $Na_2S_2O_3$
B. HNO_3	H. $NaHSO_4$
C. H_2SO_4	I. Ice
D. NaOH	J. MCAA
E. HCL	O. Other
F. MeOH	

				Matrix Code	Pres Code		RADIUM 226/228	METHOD 507	METHOD 531										
1	QT 1	4/24/03	1145	GW	3	1-GAL-HDPE 1-LTR Amb. GL 1-40ml Vial	X	X	X										
2	QT 2	4/24/03	0940	GW	3	"	X	X	X										
3	QT 3	4/24/03	1010	GW	3	"	X	X	X										
4	QT 4	4/24/03	1055	GW	3	"	X	X	X										
5																			
6																			
7																			
8																			
9																			
0																			

REMARKS

Method 507
RPT - Alachlor
ATRAZINE

Method 531
RPT - Aldicarb
Carbofuran

CHAIN OF CUSTODY FORM 10

Y/N _____ Date required Y____ N✓ None✓ 1____ 2____ 3____ Other____ (Y) N CP

____ ____	12	John Foley	4/24/03	1330	[illegible]	4/24/03	1330		
____ ____	12-12	USB Chicago - JVJ	4/24/03	1430	FedEx - JVJ	4/24/03	1700		
		FEDEX			Client	4/25/03	1010		
# ____									

3231 N.W. 7th Avenue
Boca Raton, FL 33431
888-862-LABS
561-447-7373
888-456-4846 Fax
561-447-6136 Fax

C.O.C. # 51648

CHAIN OF CUSTODY RECORD

USBIOSYSTEMS

Log # 76393 /TN4 Quote: ____

LAB USE ONLY	YES	NO	N/A
Samples INTACT upon arrival?			
Received ON WET ICE? Temp ____			
PROPER PRESERVATIVES indicated?			
Received WITHIN HOLDING TIME?			
CUSTODY SEALS INTACT?			
VOLATILES rec'd W/OUT HEADSPACE?			
PROPER CONTAINERS used?			

Company Name: MWRD PO#
Address: 6001 W Pershing
City: Stickney State Zip
Attn: Dale McDonald Fax#
Project Name: Thornton Quarry Proj#
Sampler Name/Signature: [signature] Phone# (708) 588-4132

Matrix Codes*

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SO	Soil Sediment
AFW	Analyte Free H_2O	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SU	Surface Water	O	Other ____ (Please Specify)

Pres/Codes

A. None G. $Na_2S_2O_3$
B. HNO_3 H. $NaHSO_4$
C. H_2SO_4 I. Ice
D. NaOH J. MCAA
E. HCL O. Other
F. MeOH

#	Sample ID	Date	Time	Matrix Code*		Pres.	Radium 226/228	Method 507	Method 531
1	QT-1	5/8	1210	GW	3	Ice/HCl [illegible]	X	X	X
2	QT-2	5/8	1015	GW	3	"	X	X	X
3	QT-3	5/8	1040	GW	3	"	X	X	X
4	QT-4	5/8	1110	GW	3	"	X	X	X
5									
6									
7									
8									
9									
0									

REMARKS

Method 507 –
Rpt – Alachlor
– Atrazine
Method 531 –
Rpt – Aldicarb
– Carbofuran
MJK 5/8/03

Y/N Date required ____ Y ____ N ✓ None ✓ 1 ____ 2 ____ 3 ____ Other ____ (Y) N CP

	12	[signature]	5/8/03	2:10	[signature]	5/8/03	2:10
	12-12	USB Chicago (MJK)	5/8/03	5:00pm	FedEx (MJK)	5/8/03	5:00pm
		FedEx			[signature]	5/9/03	

3231 N.W. 7th Avenue
Boca Raton, FL 33431
888-862-LABS
561-447-7373
888-456-4846 Fax
561-447-6136 Fax

C.O.C. # 51718

LAB COPY

CHAIN OF CUSTODY RECORD

USBIOSYSTEMS

Log # 76908 / HN4 Quote: ______

LAB USE ONLY	YES	NO	N/A
Samples INTACT upon arrival?			
Received ON WET ICE? Temp____			
PROPER PRESERVATIVES indicated?			
Received WITHIN HOLDING TIME?			
CUSTODY SEALS INTACT?			
VOLATILES rec'd W/OUT HEADSPACE?			
PROPER CONTAINERS used?			

Company Name Metro. Water Reclam. Distr. PO#

Address MWRDGC – STICKNEY

City CICERO State IL Zip 60804

Attn: DALE McDONALD Fax#

Project Name THORNTON QUARRY Proj#

Sampler Name/Signature RYAN KIRKLAND R. [signature] / M. CARNAN M. [signature] Phone# 708/588-4132

				Matrix Code			B Radium 226/228	A I Method 507	I Method 531								
1	QT-1	5/21/03	12:10 p.	GW	3	1-Gal HDPE 1-Ltr Amb 1-40ml Vial	X	X	X								
2	QT-2	5/21/03	10:15 A.	GW	3	"	X	X	X								
3	QT-3	5/21/03	10:35 A.	GW	3	"	X	X	X								
4	QT-4	5/21/03	11:30 A.	GW	3	"	X	X	X								
5																	
6																	
7																	
8																	
9																	
0																	

Matrix Codes*

SD Solid Waste; GW Ground Water; EFF Effluent; AFW Analyte Free H_2O; WW Waste Water; DW Drinking Water; SU Surface Water; OL Oil; SL Sludge; SO Soil Sediment; AQ Aqueous; NA Nonaqueous; PE Petroleum; O Other ______ (Please Specify)

Pres/Codes

A. None; B. HNO_3; C. H_2SO_4; D. NaOH; E. HCL; F. MeOH; G. $Na_2S_2O_3$; H. $NaHSO_4$; I. Ice; J. MCAA (circled); O. Other

REMARKS

Method 507
RPT – Alachlor
– Atrazine
Method 531
RPT – Aldicarb
– Carbofuran
MJK
5/21/03

(Y) N | ______ Date required | Y______ N ✓ | None______ 1______ 2______ 3______ Other______ | Y N

___ ___	12	M. [signature]	5/21/03	1405	[signature]	5/21/03	1405
___ ___	12-12	USB Chicago – MJK	5/21/03	6:00pm	FedEx – MJK	5/21/03	6:00pm
		FedEx			C Plasencia	5/22/03	1205
# ______							

3231 N.W. 7th Avenue
Boca Raton, FL 33431
888-862-LABS
561-447-7373
888-456-4846 Fax
561-447-6136 Fax

C.O.C. # 51776

ORIGINAL

CHAIN OF CUSTODY FORM

ATTACHMENT 1

Metropolitan Water Reclamation District of Greater Chicago

CUSTODY TRANSFER RECORD

From: STICKNEY

To: TOXIC SUBSTANCES SECTION LABORATORY, J. EGAN WRP

COLLECTED			SAMPLE SOURCE/LOCATION	LIMS NO.	BOTTLE COUNT	
DATE	TIME	BY (Full Name)				
10/24/02	13:20	THIGPEN - SKIPTON	QT #1	3758539		02510
10/24/02	11:30	THIGPEN - SKIPTON	QT #2	3758251		02507
10/24/02	12:20	THIGPEN - SKIPTON	QT #3	3758264		02508
10/24/02	12:25	THIGPEN - SKIPTON	QT #4	3758269		02509

Above items stored on site at 4°C immediately after collection Y/N _____. In custody of _____.

ITEMS TRANSFERRED	RELINQUISHED BY (Full Name)	DATE	TIME	RECEIVED BY (Full Name)	REASON FOR TRANSFER
As indicated above	TIFFANY TATE	10/25/02	3.15	Pranis	Transport samples to lab
As indicated above	Pranis	10-26-02	0230	TJ 10/29/02	Deliver samples to lab
		10/29/02	0930	~~T.J~~ P.S.	

Samples discarded following analysis on _____ by _____.

TSS CUSTODY TRANSFER RECORD
VERSION 1.0
CREATED 03/02

CHAIN OF CUSTODY FORM 14

Metropolitan Water Reclamation District of Greater Chicago

CUSTODY TRANSFER RECORD

From: Special Studies - Thornton Quarry

To: TOXIC SUBSTANCES SECTION LABORATORY, J. EGAN WRP

COLLECTED DATE	COLLECTED TIME	COLLECTED BY (Full Name)	SAMPLE SOURCE/LOCATION	LIMS NO.	BOTTLE COUNT	
3/26/03	1020	Thigpen Skyland Ziatak	QT#1 Thornton Quarry	3918117	3	M03-130
3/26/03	1120	Thigpen Skyland Ziatak	QT#2 Thornton Quarry	3918118	3	M03-131
3/26/03	1200	Thigpen Skyland Ziatak	QT#3 Thornton Quarry	3918119	3	M03-132
3/26/03	1240	Thigpen Skyland Ziatak	QT#4 Thornton Quarry	3918120	3	M03-133
			TRIP BLANK		2	M03-129

Above items stored on site at 4°C immediately after collection Y/N Y. In custody of Thigpen/Ziatak

ITEMS TRANSFERRED	RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR TRANSFER
As indicated above	Thigpen/Ziatak	3/26/03	1420	Pranis	Transport samples to lab
As indicated above	Pranis	3-27-03	0230		Deliver samples to lab
		3-27-03	0930	T. Walley	

Samples discarded following analysis on _____ by _____.

CUSTODY TRANSFER RECORD
VERSION 1.1
CREATED 10/00

CHAIN OF CUSTODY FORM 15

SWQC

Metropolitan Water Reclamation District of Greater Chicago

03 APR 10 PM 2:10

CUSTODY TRANSFER RECORD

M.W.R.D. OF GRTR. CHGO

From: Special Studies - Thornton Quarry

To: TOXIC SUBSTANCES SECTION LABORATORY, J. EGAN WRP

COLLECTED			SAMPLE SOURCE/LOCATION	LIMS NO.	BOTTLE COUNT	
DATE	TIME	BY (Full Name)				
4-10-03	1955	Thaplen Skipton	QT#1 Thornton Quarry	3937991	3	M03-150
4-10-03	1035	Thaplen Skipton	QT#2 Thornton Quarry	3937992	3	M03-151
4-10-03	1105	Thaplen Skipton	QT#3 Thornton Quarry	3937993	3	M03-152
4-10-03	1140	Thaplen Skipton	QT#4 Thornton Quarry	3937994	3	M03-153
			Trip Blank		2	M03-149

Above items stored on site at 4°C immediately after collection Y/N Y. In custody of Thaplen/Skipton

ITEMS TRANSFERRED	RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR TRANSFER
As indicated above	Thaplen/Skipton	4-10-03	1900	Pfanis	Transport samples to lab
As indicated above	Pfanis	4-11-03	0230		Deliver samples to lab
		4/11/03	0730	T. Wadley	

Samples discarded following analysis on _____ by _____.

CUSTODY TRANSFER RECORD
VERSION 1.1
CREATED 10/00

CHAIN OF CUSTODY FORM 16

Metropolitan Water Reclamation District of Greater Chicago

03 APR 24 PM 1:51 CUSTODY TRANSFER RECORD

M.W.R.D. OF GRTR. CHGO

From: JOHN FOLEY / IWD STICKNEY

To: TOXIC SUBSTANCES SECTION LABORATORY, J. EGAN WRP

COLLECTED DATE	TIME	BY (Full Name)	SAMPLE SOURCE/LOCATION	LIMS NO.	BOTTLE COUNT	
4-24-03	1145	JOHN FOLEY	QT #1 (THORTON RESERVOIR)	3953114	3	M03-190
4-24-03	0940	JOHN FOLEY	QT #2 (THORTON RESERVOIR)	3953119	3	M03-191
4-24-03	1010	JOHN FOLEY	QT #3 (THORTON RESERVIOR)	3953128	3	M03-192
4-24-03	1055	JOHN FOLEY	QT 4 (THORTON RESERVOIR)	3953130	3	M03-193
			TRIP BLANK		2	M03-189

Above items stored on site at 4°C immediately after collection Y/N ✓ In custody of JOHN FOLEY

ITEMS TRANSFERRED	RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR TRANSFER
As indicated above	JOHN FOLEY	4-24-03	1335	[signature]	Transport samples to lab
As indicated above				Pranis	Deliver samples to lab
	Pranis	4-25-03	0230		
		4/25/03	0800	T. Walley	

Samples discarded following analysis on _____ by _____.

CUSTODY TRANSFER RECORD
VERSION 1.1
CREATED 10/00

CHAIN OF CUSTODY FORM 17

SWOC - LAB
03MAY -8 PM 2:11
M.W.R.D. OF GRTR. CHGO

Metropolitan Water Reclamation District of Greater Chicago

CUSTODY TRANSFER RECORD

From: D Skipton / IWD Sidney

To: TOXIC SUBSTANCES SECTION LABORATORY, J. EGAN WRP

COLLECTED DATE	COLLECTED TIME	COLLECTED BY (Full Name)	SAMPLE SOURCE/LOCATION	LIMS NO.	BOTTLE COUNT	
5/8/03	1210	Zintak Skipton	QT-1 (THORNTON RESERVOIR)	3973894	3	M03-237
5/8/03	1015	Zintak Skipton	QT-2 (THORNTON RESERVOIR)	3973898	3	M03-240
5/8/03	1040	Zintak Skipton	QT-3 (THORNTON RESERVOIR)	3973908	3	M03-244
5/8/03	1110	Zintak Skipton	QT-4 (THORNTON RESERVOIR)	3973912	3	M03-245
			TRIP BLANK		2	M03-238

Above items stored on site at 4°C immediately after collection Y/N Y. In custody of Zintak/Skipton

ITEMS TRANSFERRED	RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR TRANSFER
As indicated above	D. Skipton	5/8/03	2:10	K Miller	Transport samples to lab
As indicated above				Pranis	Deliver samples to lab
	Pranis	5-9-03	0230		
		5-9-03	0900	T. Hadley	

Samples discarded following analysis on _____ by _____.

CUSTODY TRANSFER RECORD
VERSION 1.1
CREATED 10/00

CHAIN OF CUSTODY FORM 18

SWOS

Metropolitan Water Reclamation District of Greater Chicago

03 MAY 21 PM 3:04

CUSTODY TRANSFER RECORD

CLERK'S OFF GRTR. CHG

From: SPECIAL STUDIES

To: TOXIC SUBSTANCES SECTION LABORATORY, J. EGAN WRP

COLLECTED DATE	COLLECTED TIME	COLLECTED BY (Full Name)	SAMPLE SOURCE/LOCATION	LIMS NO.	BOTTLE COUNT	
5-21-03	1210	FARNAM/ KIRKLAND	QT-1	3992247	3	#03-262
5-21-03	1015	FARNAM/ KIRKLAND	QT-2	3992248	3	03-263
5-21-03	1050	FARNAM/ KIRKLAND	QT-3	3992249	3	03-264
5-21-03	1130	FARNAM/ KIRKLAND	QT-4	3992250	3	03-265

Above items stored on site at 4°C immediately after collection Y/N ____. In custody of FARNAM/KIRKLAND

ITEMS TRANSFERRED	RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR TRANSFER
As indicated above		5-21-03	1505		Transport samples to lab
As indicated above				Pranis	Deliver samples to lab
	Pranis	5-22-03	0230		

Samples discarded following analysis on _____ by _____.

CUSTODY TRANSFER RECORD
VERSION 1.1
CREATED 10/00