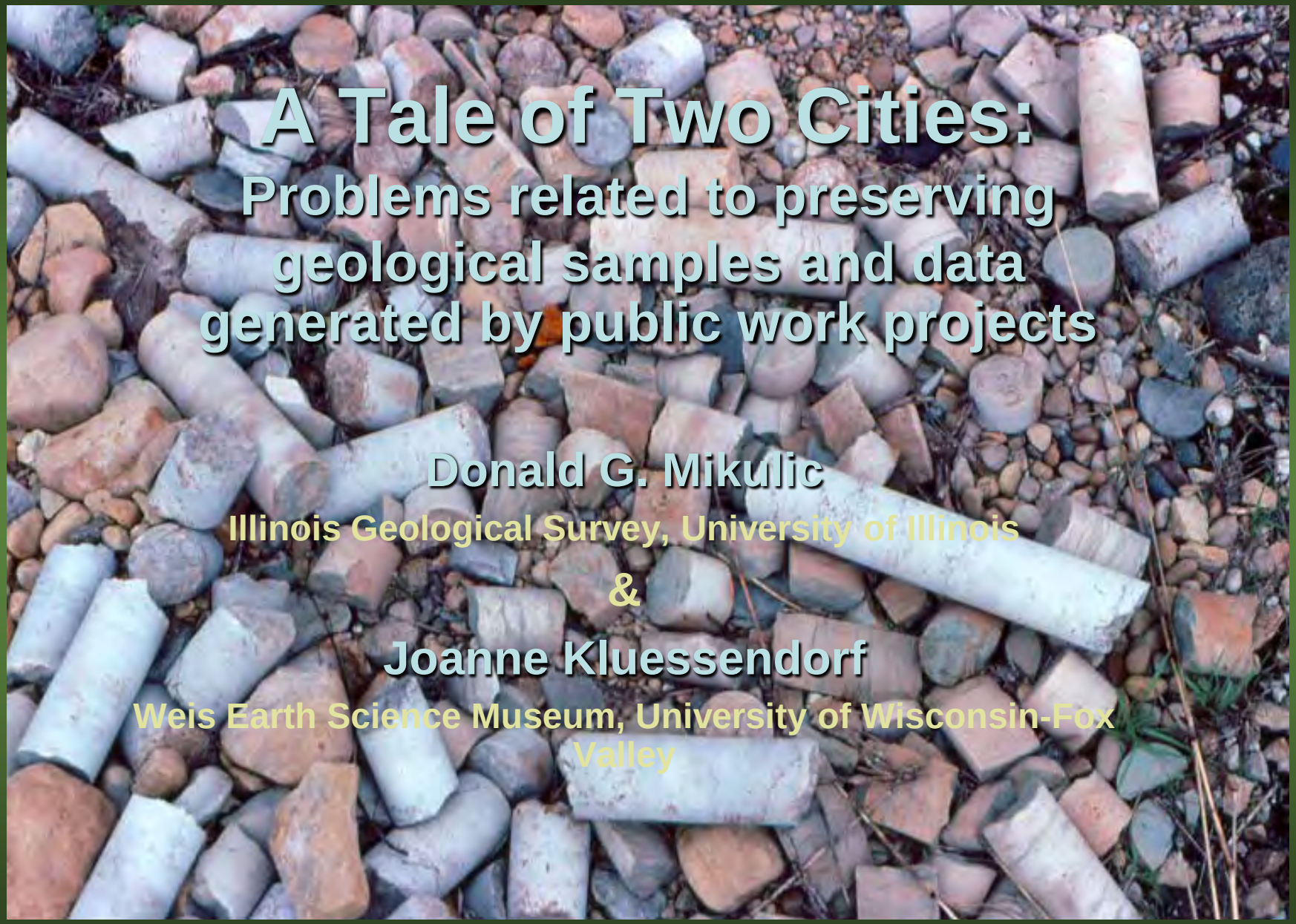


A Tale of Two Cities:
Problems related to preserving geological samples and data generated by public work projects

Donald G. Mikulic

Illinois Geological Survey, University of Illinois

&

Joanne Kluessendorf

Weis Earth Science Museum, University of Wisconsin-Fox Valley

Sources of Subsurface Geologic Samples & Information

- energy resources - generally private
- mineral resources - generally private
- environmental studies - private & public
- academic studies - generally public
- public works/infrastructure projects - mostly public

Public Works/Infrastructure

Projects

- waste disposal
- pollution abatement
- water resources
- transportation networks
- building construction

Information generated

- cores & samples
- reports
- logs

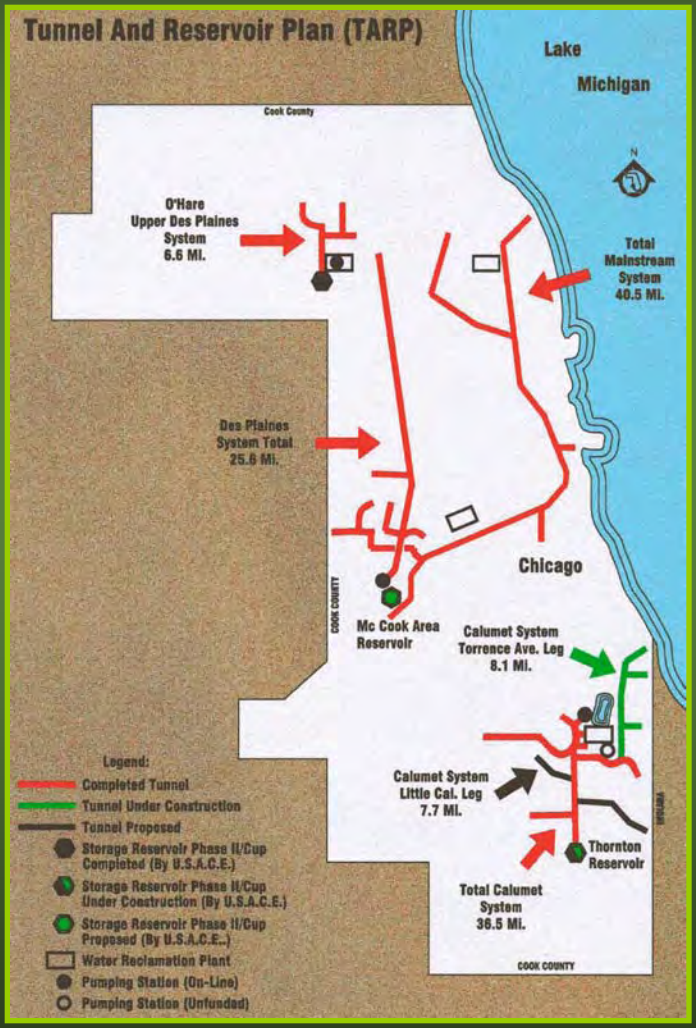
Importance & Benefits

- frequently the only significant source of geologic data for many states & metropolitan areas
- “readily available” for basic geologic research, including mapping
- potential cost savings for future scientific investigations & public works/infrastructure projects
- already paid for, generally through public funding

Problems

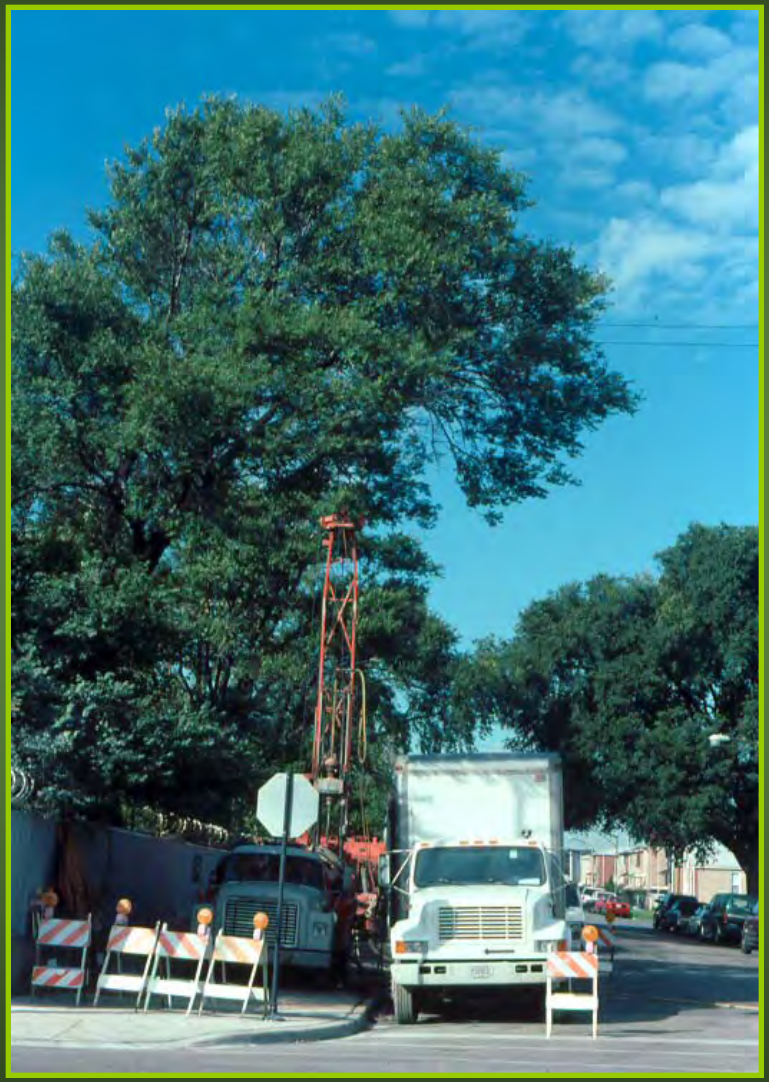
- need long-term storage for huge volumes of samples (transport, space, curation, funding)
- no dissemination or archiving of printed reports & data
- basically “internal” projects with little or no involvement by other pertinent agencies or individuals
- little appreciation for value
- lack of foresight about importance for future studies

Chicago
Tunnel & Reservoir Plan
TARP



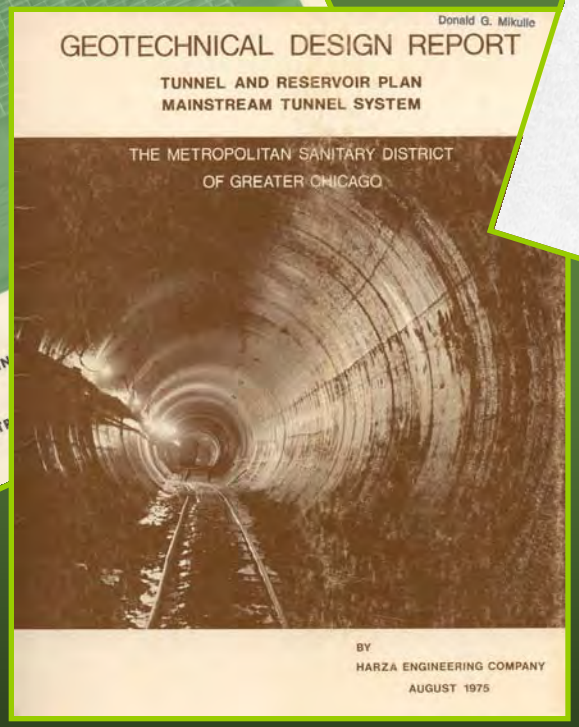
Metropolitan Water Reclamation District of Greater Chicago TARP

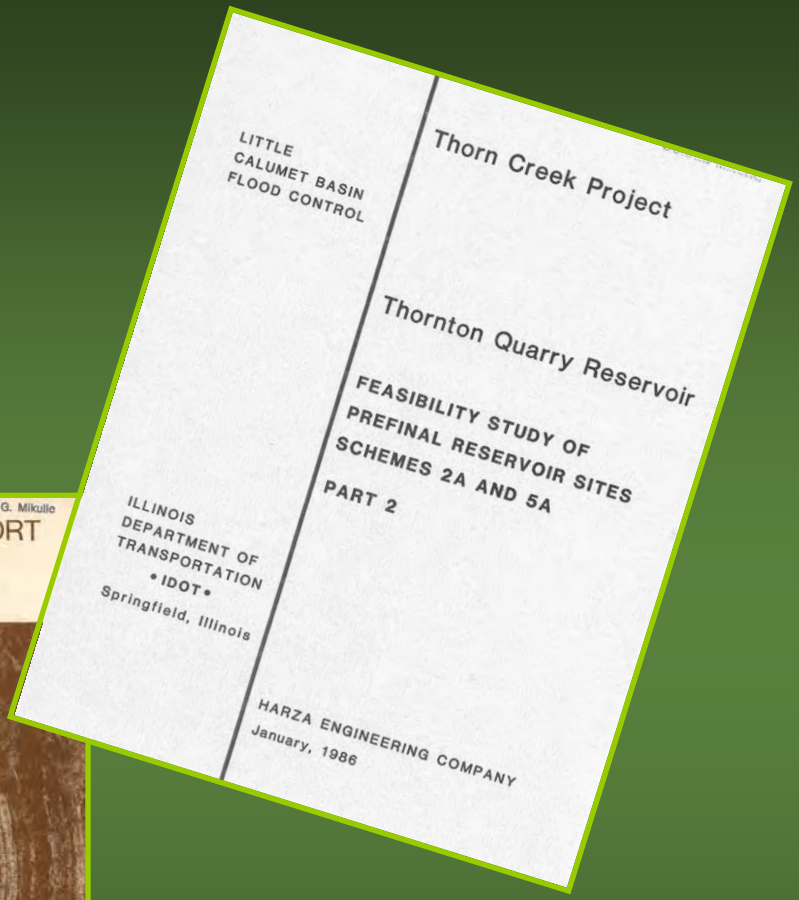
- planning began 1968
- construction began 1972
- $3.8 billion
- EPA funded 75%
- 109 miles of tunnels
- 350 ft deep max
- 9 to 33 ft. diameter
- 3 reservoirs (1 completed, 2 under construction)



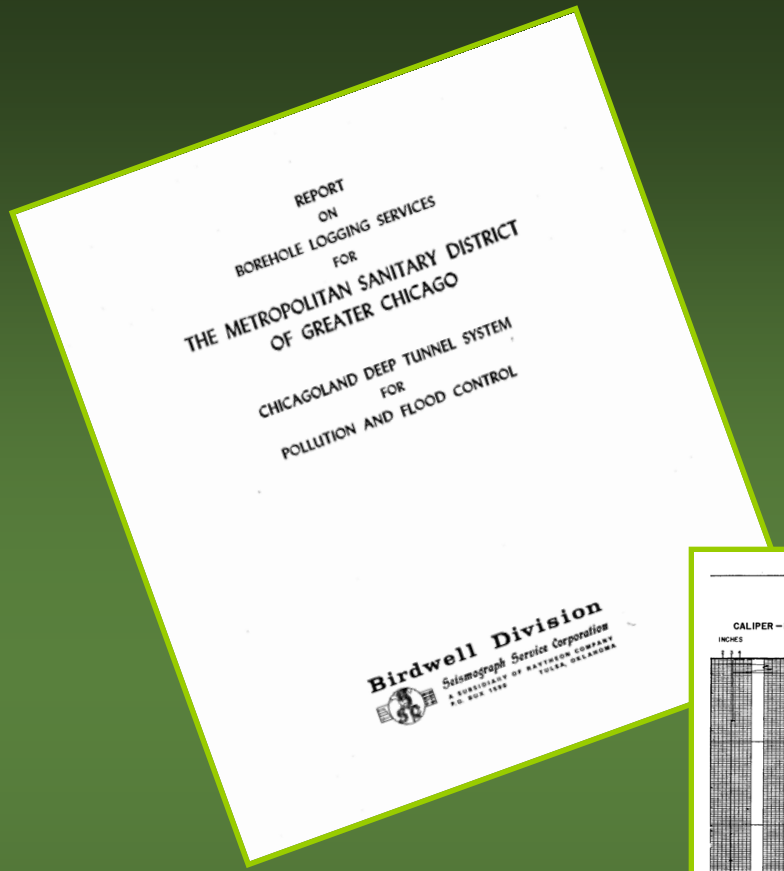
Extraordinary Opportunities

CHICAGOLAND DEEP TUNNEL SYSTEM
FOR POLLUTION AND FLOOD CONTROL
FIRST CONSTRUCTION ZONE
DEFINITE PROJECT REPORT
BY HARZA ENGIN
FOR THE METR


Donald G. Mikulle
GEOTECHNICAL DESIGN REPORT
TUNNEL AND RESERVOIR PLAN
MAINSTREAM TUNNEL SYSTEM
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO
BY
HARZA ENGINEERING COMPANY
AUGUST 1975

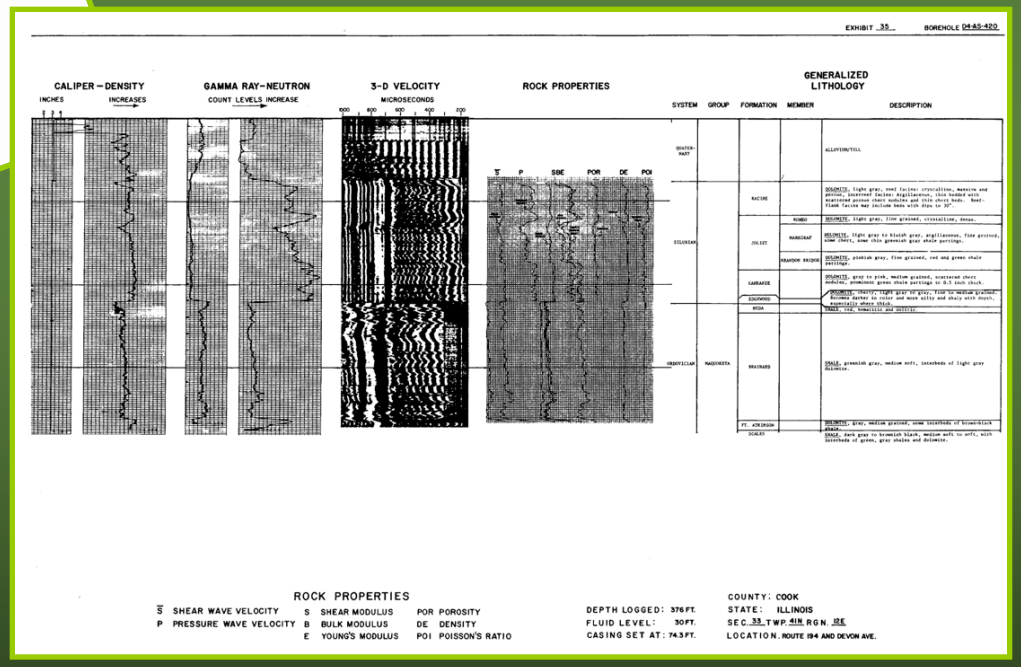

LITTLE
CALUMET BASIN
FLOOD CONTROL
Thorn Creek Project
Thornton Quarry Reservoir
FEASIBILITY STUDY OF
PREFINAL RESERVOIR SITES
SCHEMES 2A AND 5A
PART 2
ILLINOIS
DEPARTMENT OF
TRANSPORTATION
• IDOT •
Springfield, Illinois
HARZA ENGINEERING COMPANY
January, 1986

Geophysics

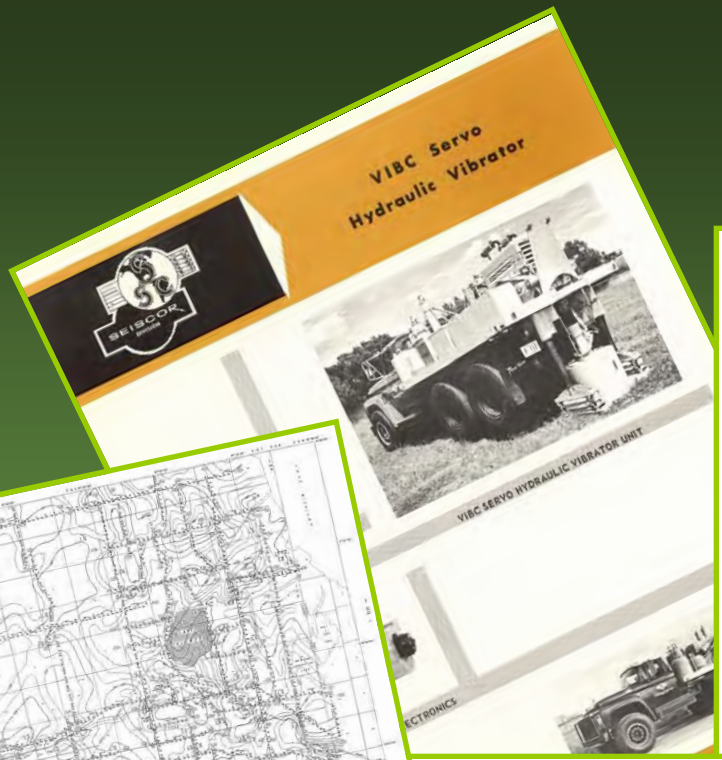

REPORT
ON
BOREHOLE LOGGING SERVICES
FOR
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO

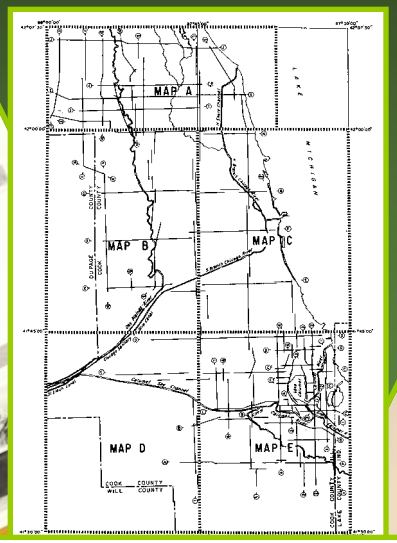
CHICAGOLAND DEEP TUNNEL SYSTEM
FOR
POLLUTION AND FLOOD CONTROL

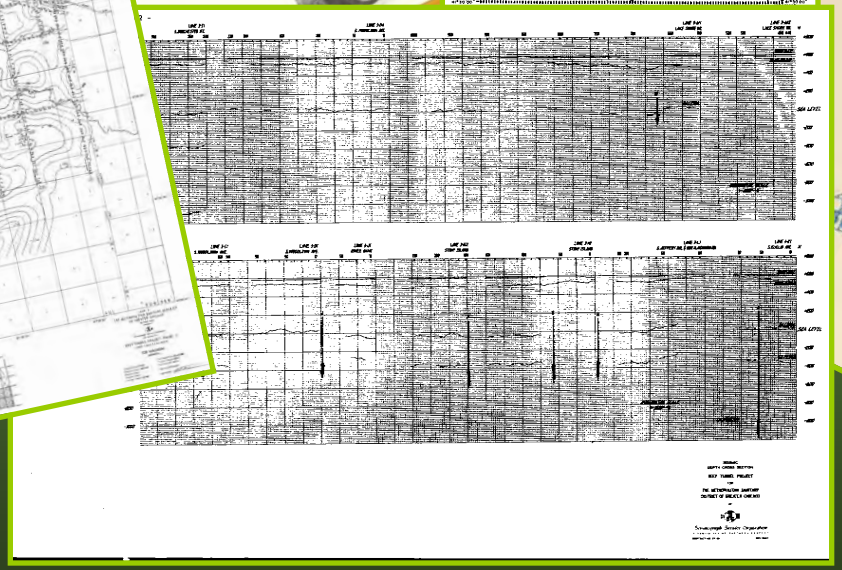
Birdwell Division
Seismograph Service Corporation
A SUBSIDIARY OF RAYTHEON COMPANY
P.O. BOX 1590 TULSA, OKLAHOMA

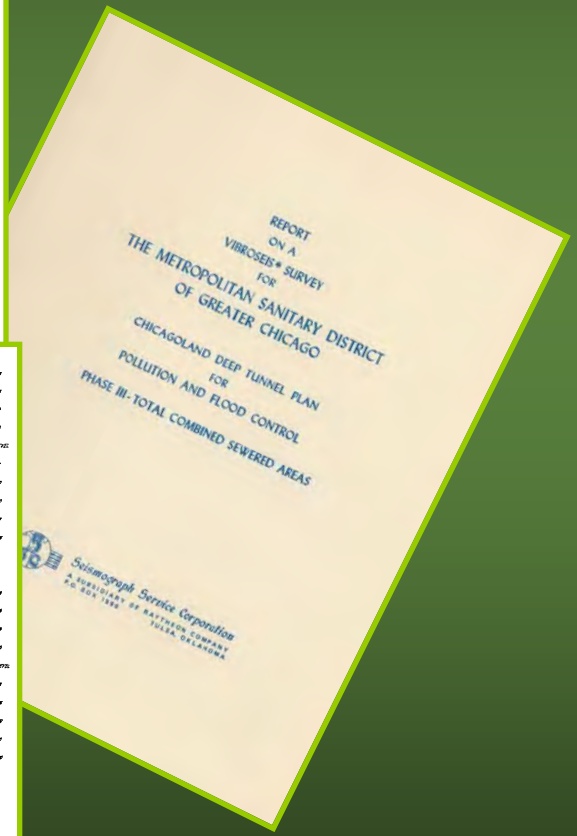


Seismic Studies








REPORT
ON A
VIBROSEIS® SURVEY
FOR
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO
CHICAGOLAND DEEP TUNNEL PLAN
FOR
POLLUTION AND FLOOD CONTROL
PHASE III - TOTAL COMBINED SEWERED AREAS
Seismograph Service Corporation
A SUBSIDIARY OF RAYTHEON COMPANY
TULSA, OKLAHOMA

TARP in Cook County

- drillhole locations
- seismic lines

TARP Cores 1968 - 1990*

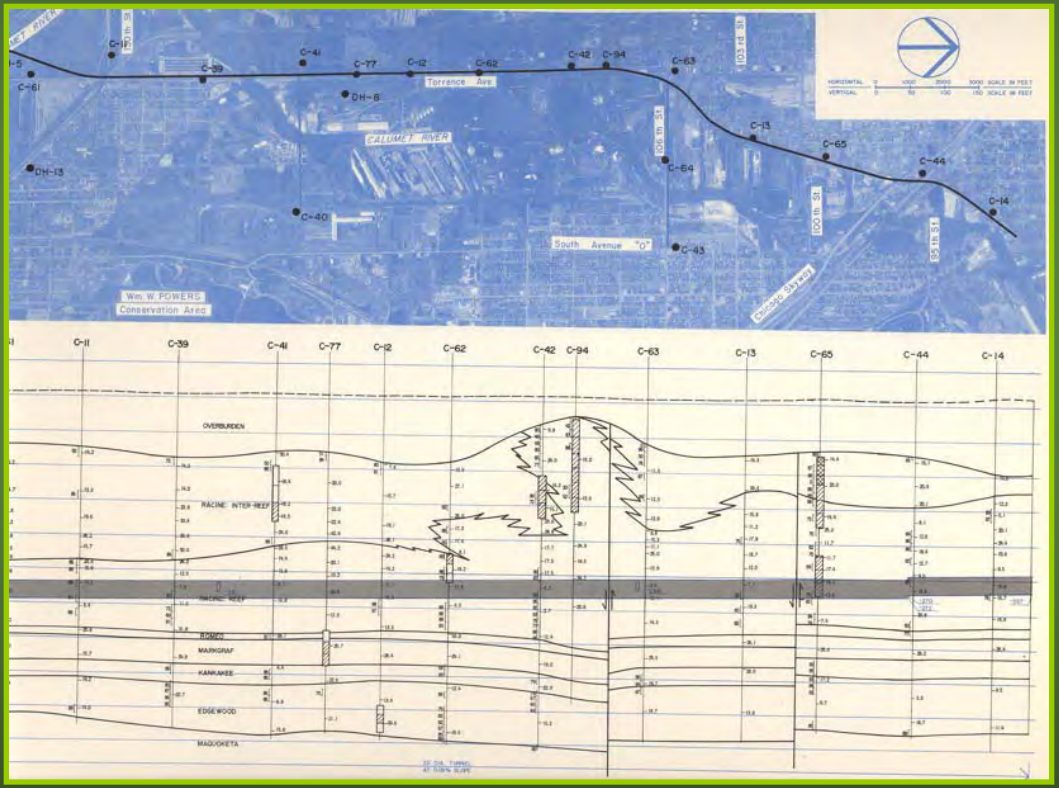
- drilled: 200,000+ ft value: $8,080,000
- ISGS permanent collection: 21,000 ft
- lost or discarded: 21,000 ft
- temporary storage: 160,000 ft (many stored outdoors; some damaged)

*Does not include several thousand feet drilled since 1990 for planning Thornton & McCook reservoirs

MWRDGC Storage
Skokie, Illinois

1992 Shipment of TARP Cores to ISGS

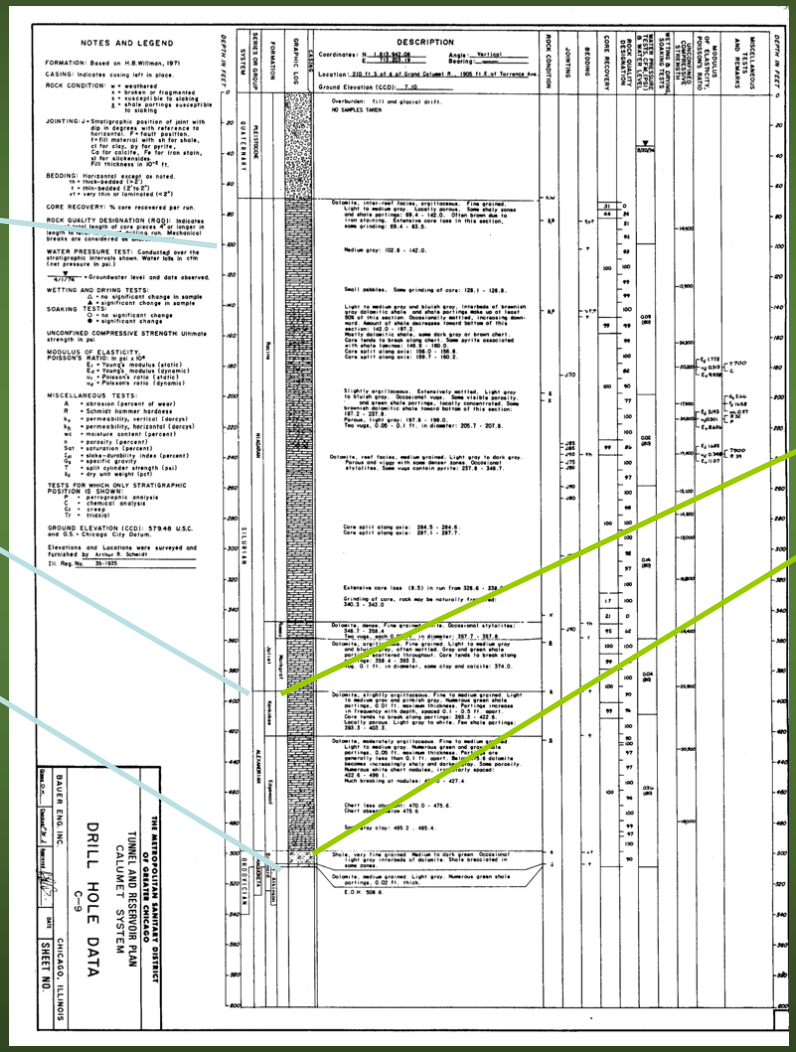
Spacing Issues



Stratigraphic Accuracy

DM/JK

- base of Devonian: 102’
- Romeo/Sugar Run
- Markgraf
- Romeo
- Brandon Bridge
- top of Kankakee: 395’
- Ordovician/Silurian contact: 501’

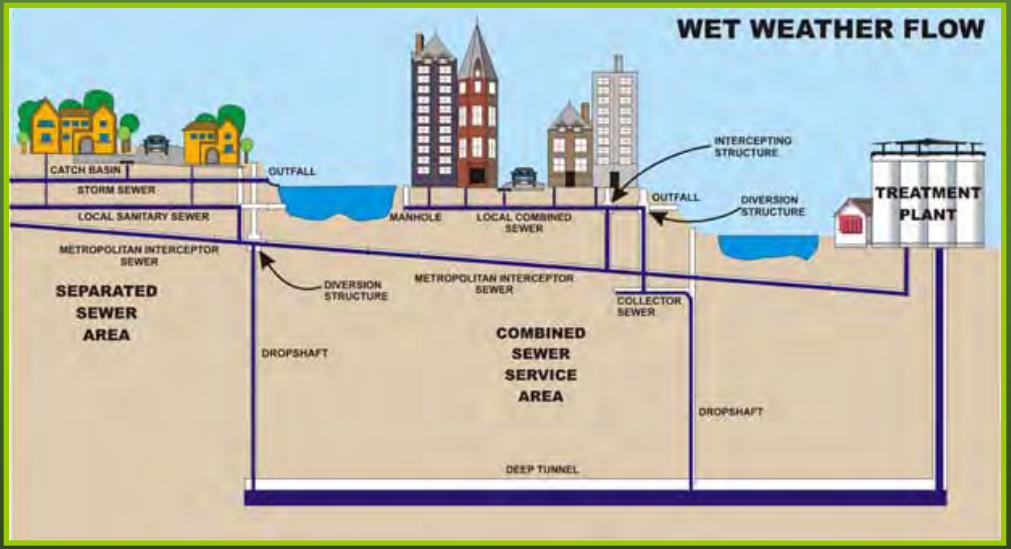


TARP

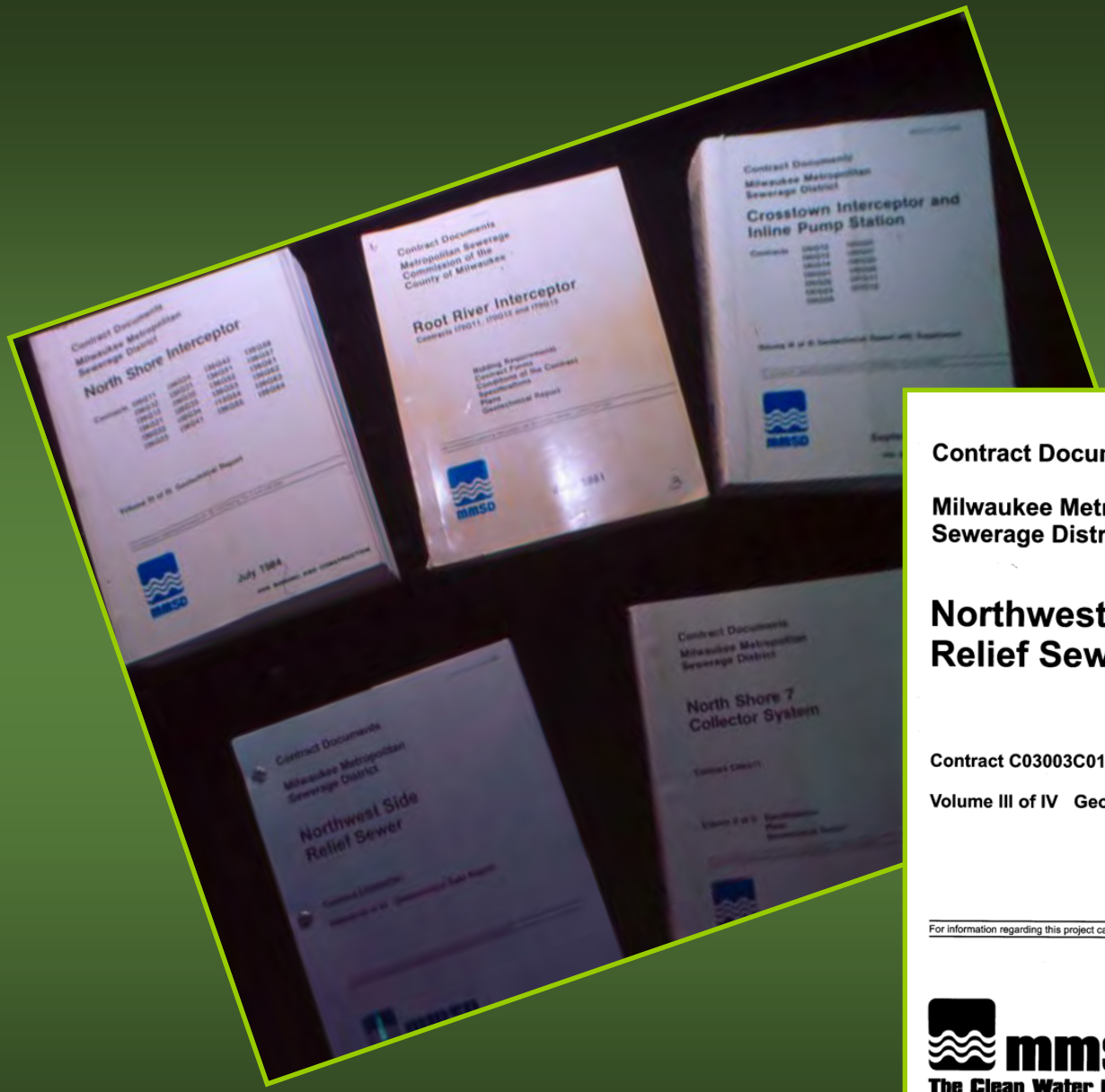
- no Devonian
- basal Racine
- Romeo
- Markgraf
- top of Kankakee: 393’
- Ordovician/Silurian contact: 499’

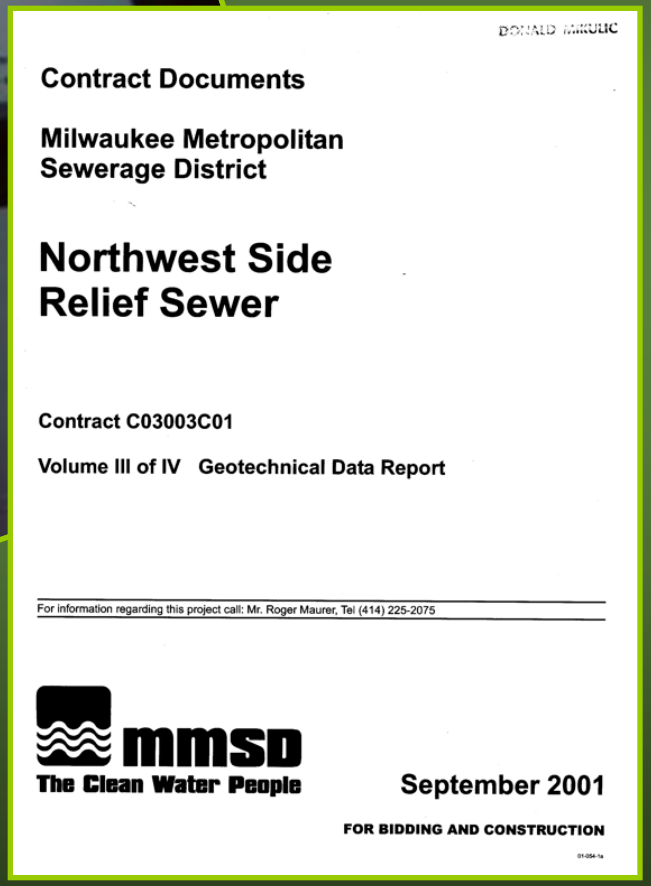
Milwaukee Deep Tunnel

Milwaukee Metropolitan Sewerage District Water Pollution Abatement Program



- began 1977
- $2.2 billion
- EPA funded 40%
- 80 miles of tunnels
- 300 ft. deep max
- 17 to 35 ft. diameter





DONALD MIRULIC

Contract Documents

Milwaukee Metropolitan Sewerage District

Northwest Side Relief Sewer

Contract C03003C01

Volume III of IV Geotechnical Data Report

For information regarding this project call: Mr. Roger Maurer, Tel (414) 225-2075

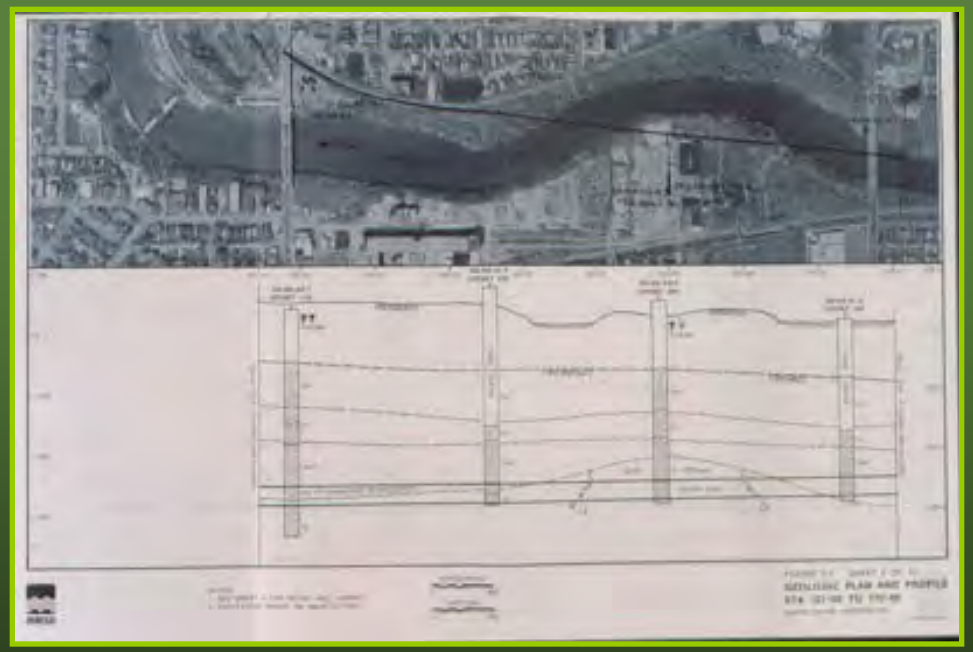
mmsd
The Clean Water People

September 2001

FOR BIDDING AND CONSTRUCTION

01-054-1a

Spacing Issues & Extraordinary Opportunities



MMSD Cores 1975 - 1988*

- drilled: 62,175 ft value: $2,784,800
- discarded: 95 grouting cores (~10,000-15,000 ft)
- discarded: all soil samples
- temporary WGNHS storage: 42,240 ft

*does not include:

Northwest Side Relief Sewer (~5000 ft drilled in 2001)

North 27th Street ISS Extension (2,525 ft drilled in 2005)

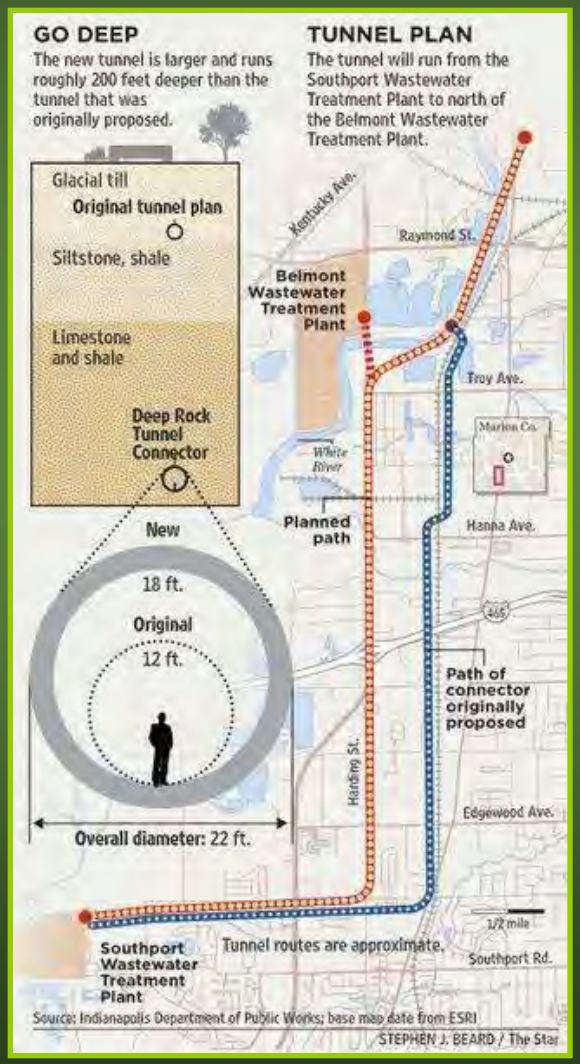
Massachusetts Water Resources Authority Boston MetroWest Tunnel

- began 1995
- $728 million
- 17.6 miles of tunnels
- 200 to 500 ft. deep
- 16 ft. diameter

New York City Water Tunnel No. 3

- began 1970
- $6.0 billion
- 60 miles of tunnels
- 250 to 800 ft. deep
- 10 to 24 ft. diameter

Indianapolis
Deep Rock Tunnel



- begins 2011
- $181 million
- 6 miles of tunnel
- 250 ft. deep
- 18 ft. diameter

Reasons for Preserving Cores

- provide the best visualization of subsurface
- reflect actual rock mass conditions
- provide unbiased, non-interpretive record
- preserve features destroyed in weathered outcrops
- can be revisited again & again, as needed
- allow new discoveries as new data, new ideas & new techniques develop
- can be viewed over time by multiple geologists, having varied experience & qualifications
- supply data in densely populated areas
- reduce duplication of expenditures

Improving Core Acquisition and Preservation

- include costs for core preservation in publicly-funded projects
- encourage notification when core becomes available from private sources
- establish protocol for core identification, condition & delivery
- integrate resources to facilitate core transfer and storage
- create policies for access and possible sampling of cores
- facilitate core use by academia and industry

Only <u>You</u> Can Prevent This!