



US Army Corps
of Engineers
Fort Worth District

Project Goal

Evaluate potential human and environmental exposure to perchlorate in the Lakes Waco and Belton study area.

--- Project Team (February 2000)





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of Engineers
Fort Worth District

Exposure Concepts *Human Exposure*

David Ebersold, R.G., C.E.G.

Vice President

MWH



Four Exposure Pathway Elements

| Potential Sources | Receiving or Transport Medium | Exposure Point | Possible Exposure Routes |
|---|--|---|---|
| <ul style="list-style-type: none"> - NWIRP McGregor | <ul style="list-style-type: none"> - Water - Soil - Air - Sediment - Food | <ul style="list-style-type: none"> - Point of contact between receptor and receiving or transport medium | <ul style="list-style-type: none"> - Ingestion - Inhalation - Dermal Contact |
| <ul style="list-style-type: none"> - Ft. Hood (Limited surface water sampling) | <ul style="list-style-type: none"> - Lake Belton | | |

All Four Elements Required for Complete Exposure Pathway to a Receptor



Potential Exposure Pathways



Field Studies Designed to ID Exposure Pathways



| <i>Study</i> | <i>Pathway Elements Addressed by Study</i> | | | |
|---|--|---------------|-----------------------|-----------------------|
| | Source | Medium | Exposure Point | Exposure Route |
| ★ Stream Sampling | + | + | + | |
| ★ Groundwater / Surface Water Levels ADCP Study | | + | + | |
| Intake Sampling | | | + | |
| Delta Areas Study | | + | + | |
| Sediment Pore Water Sampling | | + | + | |
| Anoxic Study, Perchlorate Transformation | | + | | |
| Vegetation Sampling / Laboratory Studies | | + | + | |
| Market Basket Study | | + | + | |
| Animal Sampling (Fish, Amphibians, Birds, Mammals) / Laboratory Studies | | + | + | + |

Nearly 40 individual field, laboratory, and modeling studies completed





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Automated Stream Sampling and Water Level Monitoring



Over 2,800
samples
analyzed from
15 stream sites



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| Sediment Pore Water Sampling | | + | + | |
| Anoxic Study, Perchlorate Transformation | | + | | |
| Vegetation Sampling / Laboratory Studies | | + | + | |
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Lake Belton Transects (ADCP)





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Lake Belton ADCP Study

(Survey across 23 transects in Lake Belton)



Field Studies Designed to ID Exposure Pathways



| <i>Study</i> | <i>Pathway Elements Addressed by Study</i> | | | |
|---|--|---------------|-----------------------|-----------------------|
| | Source | Medium | Exposure Point | Exposure Route |
| Stream Sampling | + | + | + | |
| Groundwater / Surface Water Levels | | + | | |
| ADCP Study | | + | + | |
| Intake Sampling | | | + | |
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| Anoxic Study, Perchlorate Transformation | | + | | |
| Vegetation Sampling / Laboratory Studies | | + | + | |
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