

Administrative Report 88-1
STERLING AREA HYDROGEOLOGICAL EVALUATION
Project Proposal

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APRIL 1988

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INTRODUCTION

Sterling is a rural community located on the Kenai Peninsula of south-central Alaska that is almost completely dependent on local ground water for water supplies. Local residents, the Alaska Department of Environmental Conservation (DEC), and the U.S. Environmental Protection Agency (EPA) have been concerned in recent years about the potential for ground-water contamination from past activities at the Sterling Special Waste Site (SSWS) located at Sterling. The SSWS was a solid and liquid waste disposal facility operated from the early 1970's until January 1987. Although wastewater containing high concentrations of inorganic constituents were discharged to the ground at the site, no ground-water contamination has been confirmed. Because of the SSWS's location in an old gravel pit topographically upgradient and less than 2 miles away from numerous private water-supply wells, and the history of use of the site, the long-term risks associated with past activity at the site may be significant.

STATEMENT OF PROBLEMS

Abundant data have been collected at the SSWS and from private wells nearby. These records show that glacial deposits at the site consist of a heterogeneous mixture of silt, sand and gravel. A shallow aquifer is reported to exist at the site, but is reported to have been saturated only during times of hydraulic loading of the site. The lateral extent of this aquifer is unknown, but it may have been sufficiently extensive to allow the transport of contaminated water off the site and beyond the area of influence of deeper monitoring wells at the site. Once offsite, contaminated water would probably have entered the local ground-water flow system. Because ground-water flow systems have not been identified and described in this area, and because

geology and topography near the site are relatively irregular, the probable pathways of contamination travel are not clearly known.

In recognition of the long-term risks associated with the SSWS, the site closure plan approved by DEC requires long-term ground-water quality monitoring. Lacking definition of ground-water flow systems, the inappropriate selection of ground-water sampling points may result in the inefficient expenditure of monitoring funds. Existing wells, in fact, may not be properly located to detect the presence of a contaminant plume.

Although existing water-quality data near Sterling have not been systematically reviewed or organized, they indicate that natural ground-water quality varies considerably from place to place. In order to interpret long-term monitoring data properly, natural variations in water quality must be assessed. Additionally, the data should be readily available, of known quality, and directly attributable to specific geologic deposits. This requires the ready availability of water well logs. Currently, water well logs for the Sterling area are unorganized, scattered among various places, and not accurately correlated with actual well locations. In summary, existing data near Sterling are not well organized and have not been incorporated into a conceptual hydrogeologic framework, but do indicate the possible presence of an undetected plume of ground-water contamination.

GOALS AND DESCRIPTION OF PROJECT

The goals of the Sterling area hydrogeological evaluation are to assemble, evaluate, and distribute data near the SSWS and to evaluate the long-term potential for significant ground-water quality degradation in the

nearby populated areas. To accomplish these goals, the project has been divided into two phases. Phase I of the project will be a records search and preliminary hydrogeological evaluation. Tasks will consist of:

1. a review of relevant literature;
2. obtaining and processing extant well-log data through the existing DGGs/USGS cooperative well-log database;
3. developing an appropriate method for assembling water quality data;
4. obtaining and processing extant water quality data;
5. describing and mapping aquifers and ground-water flow systems;
6. describing natural ground-water quality variations;
7. reviewing data regarding the amounts and types of wastes disposed of at the SSWS; and
8. performing limited field work for verification or clarification of extant data.

The results of Phase I will be prepared for publication as a Report of Investigations entitled: "Preliminary hydrogeological evaluation at Sterling, Alaska".

Phase II of the Sterling project will be conducted to specifically evaluate the potential for a significant ground-water contamination plume originating at the SWSS. Phase II will not be initiated until Phase I is virtually complete, and will utilize Phase I findings. Anticipated work tasks for Phase II include:

1. surficial geophysics to identify the locations of possible electrical anomalies associated with high ionic strength ground water;

2. installation and sampling of monitoring wells; and
3. borehole geophysics to facilitate correlation and interpretation of subsurface deposits.

Depending on the timing of events, the report from Phase I of the investigation could be amended to include Phase II results, or these results could be published separately.

BENEFITS OF PROPOSED WORK

Sound management of ground-water resources requires sound information for decision-making purposes. The benefits of the proposed project are as follows:

1. The project would result in permanent and accessible well log and water quality databases for management. Development of the water quality database could be used as a prototype for developing other water quality databases for the state's solid waste, wastewater, hazardous waste, drinking water or ambient water-quality programs.
2. The project is anticipated to be consistent with Alaska's Ground Water Protection Strategy (currently under development) and with the enabling legislation for DGGs's water data program (see AS41.08).
3. The project would provide a vehicle for greater interagency cooperation.
4. The project would result in an improved ability to interpret the results of long-term monitoring near the SSWS, and may lead to an improved monitoring program to meet the monitoring goals.
5. The project would effectively utilize experienced employees otherwise scheduled for periods of seasonal leave without pay.

6. Benefits of the project as described in items 1-5 above would begin immediately and not be dependent on funding for completion of the entire 2-year project.
7. If a contaminant plume exists, it could be detected before it reaches local wells, allowing substantially more lead time and flexibility for developing alternate water supplies or taking remedial actions.

SUMMARY OF PROJECT BUDGET, TIMETABLE, AND PERSONNEL

Phase I of the project is anticipated to be completed during state fiscal year 1989 utilizing 6-10 man months of staff time. Staff time would be split among 4 or more hydrologists ranging from a Hydrologist I to a Hydrologist IV, plus a student intern. Fiscal year 1989 costs for the project are estimated to range from \$30,000 to \$50,000, including travel, supply, and equipment costs. Staff utilized for this project are all current DGGs employees with a minimum of 3 years of state experience.

Phase II of the project would be conducted during FY1990 and is expected to cost approximately \$70,000 to \$90,000. The scope and cost of the Phase II investigation may be substantially modified based on the results of the Phase I study.