

**INTERIM RESULTS
AND
REVISION
TO
WORK PLAN
OF
SEPTEMBER 22, 1999**

**CHLOROFORM INVESTIGATION PHASE 2: INVESTIGATION
OF REPRESENTATIVENESS OF MW-4 FOR GROUNDWATER
MONITORING PURPOSES**

OCTOBER 22, 1999

Submitted to:

**U.S. Nuclear Regulatory Commission
Utah Department of Environmental Quality
U.S. Environmental Protection Agency**

Submitted by:

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The following presents preliminary results from Task 1 and a revision to Tasks 2 and 3 of the September 22, 1999 Work Plan for Chloroform Investigation Phase 2: Investigation of Representativeness of MW-4 for Groundwater Monitoring Purposes; and a rationale for the revision based on analysis of data collected as part of Task 1.

Based on preliminary analysis of pumping tests conducted at MW-4 during the week of September 27, 1999 (as part of Task 1), the average hydraulic conductivity of the Dakota/Burro Canyon Formation in the vicinity of MW-4 is estimated to be approximately one to two orders of magnitude higher than previously estimated. As a result, chloroform that may have been introduced into MW-4 in 1991 could have traveled much farther downgradient than previously estimated. This increases the amount of water that would have to be pumped to retrieve the chloroform-contaminated groundwater to such an extent that this option (Task 2) is no longer feasible without collecting further data regarding the extent of chloroform in the vicinity of MW-4.

Assuming an average hydraulic conductivity in the vicinity of MW-4 of 0.66 feet per day (based on the preliminary test analysis), homogeneous conditions, a groundwater gradient of 0.012, an effective porosity of 17.9%, and no retardation or dispersion of chloroform in the perched groundwater, any chloroform introduced into MW-4 in 1991 could have traveled as much as 129 feet downgradient (to the south). By further assuming that the capture zone developed through pumping MW-4 is cylindrical, a minimum of approximately 4 million gallons of water would have to be pumped to capture the contaminated groundwater if pumping were started at once at a sufficiently high rate. Because of dispersion, and because the actual capture zone would not be cylindrical, would be limited in its downgradient extent, and would develop

slowly over time, the actual amount of water required to be pumped would be greater. This would not be feasible unless a method for management of large volumes of retrieved water were devised.

To collect information to help delineate the extent of chloroform contamination in the perched water, a series of temporary borings will be installed in a staged fashion. Initially, only 2 borings will be installed, located approximately 125 feet north (upgradient) of MW-4, and approximately 130 feet south (downgradient) of MW-4. The downgradient boring will be located at approximately the distance chloroform may have traveled if introduced into the well in 1991. The installation of any further borings will be based on the results of groundwater samples and other data collected from these initial borings.

Each temporary boring will be drilled to a depth of at least 120 feet below land surface (bls), or to the top of the Brushy Basin shale, whichever is less and equipped with a temporary 3- or 4-inch diameter PVC casing screened in at least the lower 40 feet. Samples of drill cuttings or borings will be collected every 2 ½ feet of drilled depth, placed in individual sample bags, labeled as to the boring location and depth interval, and stored on site. Sample lithology will either be described at the time of drilling or at a later time by a geologist. Each installation will be allowed to stand for at least 24 hours prior to purging and sample collection. Samples will be collected using disposable bailers after purging each installation of at least 3 bore volumes. Samples will be collected for analysis of chloroform by an off-site laboratory.

After sampling, the decision to install more borings, or to collect additional data from the borings will be based on the analytical results. For example, if chloroform is detected in the

upgradient boring, then the hypothesis that the chloroform originated as a result of well tampering will likely be discounted, and further borings will be installed upgradient (to the north), and sampled, to attempt to locate the upgradient extent of the chloroform. If chloroform is detected in the upgradient boring, then two additional borings will also be installed cross-gradient of MW-4, one to the east, and one to the west, to help delineate the lateral extent of chloroform in the perched water that may be originating upgradient. If chloroform is detected in the downgradient boring, one or more additional boring(s) may be installed downgradient of that boring. This would be done only if chloroform is detected in the downgradient boring.

Once the necessary data have been collected from each temporary boring, a decision will be made either to: (1) abandon the boring, or (2) complete it as a permanent groundwater monitoring well. Prior to abandonment, the depth to water will be measured at least twice on different days. If the water levels have not stabilized, the abandonment may be postponed until additional measurements indicate that water levels have stabilized.

REVISED
SCHEDULE FOR CONTAMINATION
INVESTIGATION SUBMITTALS
Revision 1

UDEQ Docket No. UGQ-20-01/August 23, 1999

Submitted by International Uranium (USA) Corporation

Submitted
September 20, 1999
Revised October 22, 1999

1. CHARACTERIZATION OF CHLOROFORM POLLUTION IDENTIFIED in MW-4

The characterization of chloroform pollution identified in MW-4 will include descriptions of:

- (1) The amount, form, concentration, toxicity, environmental fate and transport, and other significant characteristics of chloroform;
- (2) The areal and vertical extent of the chloroform concentration and distribution; and
- (3) The extent to which chloroform has migrated and is expected to migrate.

Characterization of chloroform pollution that has been detected at MW-4 will be accomplished in the following phases, with each being modified and/or guided by data gathered in the preceding phase:

Phase 1: Chloroform Source Assessment Report/Copies to NRC, UDEQ, and U.S. EPA. Interviews, historical research, and field work is largely complete. These data will be compiled into a report, with the assistance of a technical expert.

Milestone: September 30

Status: Report submitted September 29, 1999

Phase 2: Work Plan for Evaluation of Representativeness of MW-4 for Chloroform Detection/Copies to NRC, UDEQ, and U.S. EPA. Preliminary plans have been developed, and will be incorporated into a field Work Plan.

Milestone: September 24

Status: Submitted September 23, 1999

Phase 2a: Implementation of Work Plan for Evaluation of Representativeness of MW-4 for Chloroform Detection. The Work Plan will be implemented as soon as possible upon its completion to ensure that necessary data for subsequent phases are collected promptly and, hopefully, before major weather changes which might affect the schedule.

Milestone: September 28

Status: Implemented September 28

Phase 2b: Report on Representativeness of MW-4 for Chloroform Detection copied to NRC, UDEQ, and U.S. EPA. Data will be evaluated by independent geochemical, hydrology, and fate and transport experts, and they will assist IUSA in preparation of a report.

Milestone: November 4

Revised Milestone: Submit interim results and Revised Phase 2 Work Plan on October 22

Phase 3: Resampling of MW-4

Milestone: October 29

Revised activity to conduct sampling as per Revised Phase 2 Work Plan

Revised Milestone: Implement Revised Phase 2 Work Plan November 2

Phase 4: (Dependent upon results of Phase 3) (a) Development of monitoring program for chloroform at MW-4 or (b) Development of program for the delineation of a potential chloroform plume in the area of MW-4, and copies of plan for such program to NRC, UDEQ, and U.S. EPA. Independent technical experts will assist IUSA in either the development of a monitoring program for chloroform at MW-4 or development of a program for delineation of a potential chloroform plume.

Milestone: November 26

Revised Milestone: January 28

Phase 5: (Dependent upon results of Phase 4) (a) Implementation of program for monitoring chloroform at MW-4 or (b) Implementation of program for the delineation of a potential chloroform plume in the area of MW-4. If a program for monitoring chloroform at MW-4 is indicated, based on results of Phase 4, then it will be implemented within the first quarter of the year 2000. If, however, a program for delineation of a potential chloroform plume is indicated by Phase 4 results, then weather may affect IUSA's ability to implement the field program at the same proposed date as for (a), and therefore a later date is indicated for the completion of (b).

Milestone for (a): January 10, 2000

Milestone for (b): March 6, 2000

Revised Milestone for (a): February 14, 2000

2. FACILITY CHARACTERIZATION

The Facility Characterization will include descriptions of:

- (1) Location of Chloroform present and media of occurrence;
- (2) Hydrogeologic conditions underlying and upgradient and downgradient of the facility;
- (3) Surface waters in the area;
- (4) Climatologic and meteorologic conditions in the area of the facility;
- (5) Type, location and description of possible sources of chloroform at the facility; and
- (6) Groundwater withdrawals, pumpage rates, and usage within a 2-mile radius.

3. DATA REPORT

The Data Report will include:

- (1) Data packages including quality assurance and quality control reports;
- (2) A description of the data used in the report; and
- (3) A description of any data gaps encountered, how those gaps affect the analysis and any plans (if warranted) to fill those gaps.

4. FINAL REPORT

A report including characterization of chloroform pollution identified in MW-4, facility characterization, and a data report will be sent to NRC, UDEQ, and U.S. EPA on or before **March 20, 2000** if program (a), described in Phase 5 is followed, or **May 26, 2000** if program (b) described in Phase 5 is followed. This date will allow for inclusion of data from Phase 5 of the characterization of chloroform pollution, if required.

Revised report date for program (a): April 24, 2000

5. EVALUATION OF EIGHT OTHER PARAMETERS DISCUSSED IN UDEQ TRANSMITTAL LETTER OF AUGUST 23, 1999

In the transmittal letter accompanying the Notice of Violation and Groundwater Corrective Action Order dated August 23, 1999, the Director of the Division of Radiation Control requested that IUSA include certain parameters, which are generally referred to in an accompanying Issue Paper as "some or all (sic) which may be due to background groundwater conditions at the site", in the Groundwater Contaminant Investigation mandated by the attached order. The August 23 letter describes the parameters of interest, which are not part of the Notice of Violation and Groundwater Corrective Action Order, as follows:

"In addition to the chloroform discovered in IUC monitoring well MW-4, four (4) (sic) other pollutants have been identified in wells sampled which appear to be in excess of State health based groundwater standards, including: Gross alpha [MW-2, MW-3, MW-4, MW-12, MW-14, MW-15, MW-17, MW-18, and MW-19], nitrate+nitrite (N) [MW-4], manganese [MW-1, MW-3, MW-4, MW-11, MW-14, MW-15, MW-17, and MW-18], selenium [MW-15], and total uranium [MW-3, MW-4, MW-14, MW-15, MW-17, MW-18, and MW-19]. Three (3) other potential indicators of groundwater pollution were also found in concentrations below State health based groundwater standards, ammonia, iron, and tetrahydrofuran."

Although the letter describes groups of "four" and "three" parameters, IUSA understands that UDEQ requests review of a total of eight (not seven) parameters, those being:

1. Gross alpha
2. Nitrate+nitrite (N)
3. Manganese
4. Selenium
5. Total uranium
6. Ammonia
7. Iron
8. Tetrahydrofuran

A report on the evaluation of the above eight parameters will be sent to NRC, UDEQ, and U.S. EPA on or before **November 30, 1999**.