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Groundwater Monitoring Well Installation & Monitoring Report Davis-Besse Nuclear Power Station Oak Harbor, Ohio

FirstEnergy Nuclear Operating Company

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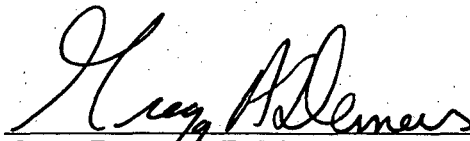
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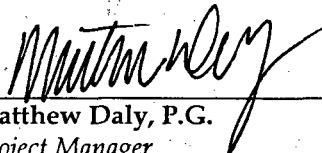
Oak Harbor, Ohio

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APC	radiological area of potential concern
ASL	above sea level
CSM	conceptual site model
°C	degrees Celsius
DBNPS	Davis-Besse Nuclear Power Station
DO	dissolved oxygen
EPA	United States Environmental Protection Agency
ERM	Environmental Resources Management
FD	field duplicate
FENOC	FirstEnergy Nuclear Operating Company
FSP	field sampling plan
NEI	Nuclear Energy Institute
MDC	minimum detectable concentration
NTU	nephelometric turbidity unit
ORP	oxidation-reduction potential
PID	photoionization detector
pCi/L	picoCuries per liter
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
R	rem
REMP	Radiological Environmental Monitoring Program
us/cm	microsiemens per centimeter

EXECUTIVE SUMMARY

On behalf of FirstEnergy Nuclear Operating Company (FENOC), Environmental Resources Management (ERM) has prepared this *Groundwater Monitoring Well Installation and Monitoring Report* to document the development of a groundwater monitoring program at the Davis-Besse Nuclear Power Station (DBNPS) located in Oak Harbor, Ohio. The purpose of the groundwater program is to assess whether there have been any inadvertent radiological releases from the Power Block that may have impacted site groundwater or have the potential to migrate toward Lake Erie or any other human or environmental receptor.

Activities completed included an inventory and assessment of existing site wells, the installation of five groundwater monitoring well triplets and a water table well (i.e., 16 new wells), the preparation of groundwater field sampling plans, the sampling of groundwater monitoring wells (three events), and the evaluation of groundwater monitoring results in the context of the hydrogeologic regime.

The key findings from the groundwater investigation include the following:

Geology

- The surficial geology beneath the DBNPS consists of Glaciolacustrine and Till units. The Glaciolacustrine unit is characterized as cohesive, brown silt with some sand and clay. The Till is characterized as brown to dark-gray, silty clay.
- Beneath the Till is Dolomite Bedrock, subdivided into a Laminated Dolomite and a Massive Dolomite. The Laminated Dolomite, which is encountered above and below the Massive Dolomite, contains thin layers of interbedded dolomite, gypsum, anhydrite and shale. The Massive Dolomite is approximately 10 feet thick, hard, finely grained, and located approximately 10 feet below the top of the Dolomite.

Historic Well Inventory

- A total of 54 wells (27 couplets) were located and inspected during the well inventory and 24 wells (12 couplets) could not be found. Each well couplet consists of a shallow and deep well within the

Dolomite Bedrock. The shallow bedrock well is screened within the Upper Dolomite and the deeper bedrock well is screened in the Lower Dolomite. The Massive Dolomite unit separates wells screened within the Upper and Lower Dolomite.

- The historic wells, by themselves, were not sufficient to create an effective groundwater monitoring program at DBNPS because they did not provide adequate lateral and vertical coverage. In addition, due to the age of the wells, their construction quality and subsurface conditions are not known.

Groundwater Flow

- The ability to develop groundwater elevation contours and flow patterns is complicated by several factors, including the presence of a grout curtain, the flow of groundwater within discrete fractures in bedrock, the large area of excavated bedrock beneath the Power Block and the high degree of mineralized groundwater and associated low yield observed in the new Lower Dolomite wells. An additional uncertainty is the usability of historic elevation survey data that were used to calculate groundwater elevations from the historic wells.
- Based on the distribution of groundwater elevations, groundwater flow in the Till, Upper Dolomite and Lower Dolomite units is from west to east across the site.
- The ultimate discharge point for groundwater in the Till, Upper Dolomite and Lower Dolomite is the marshes and/or Lake Erie east of the Power Block.

Groundwater Quality

- Strong hydrogen sulfide odors were noted in site groundwater, particularly new Lower Dolomite wells MW-101C, MW-102C, MW-103C and MW-104C located east of the Power Block. The hydrogen sulfide is believed to be naturally occurring and caused by the weathering of gypsum and anhydrite minerals. Groundwater field parameters at these wells are characterized by high specific conductance, low ORP and high turbidity water.
- High hydrogen sulfide gas levels at wells MW-101C, MW-102C, MW-103C and MW-104C may be inadvertently trapped due to the use of expansion plugs at these wells. The sulfide gas may limit the

ability for the well screen to communicate with the Lower Dolomite. Future modifications to the expansion plugs to allow venting of the sulfide gas will be evaluated in effort to obtain more accurate groundwater elevation data from these wells.

- Reported concentrations of tritium in groundwater between 178 pCi/L and 348 pCi/L represent statistically insignificant activity at the 95% confidence level and are considered representative of local background conditions. Factors influencing local background condition may include the historic atmospheric bomb testing program, cosmic ray interactions in the earth's atmosphere and localized washout from continuous and batch gaseous releases from DPNBS. Reported values above 348 pCi/L represent concentrations that are statistically greater than local background conditions.
- Tritium concentrations above the 348 pCi/L background value were located primarily in monitoring wells east of the Power Block.
- Tritium concentrations in the wells screened in the Till ranged from less than the minimum detectable concentration (MDC; <193 pCi/L) to 1,832 pCi/L. The highest concentrations were detected down-gradient (northeast) of the Power Block, including MW-102A (387 pCi/L), MW-103A (495 pCi/L), and MW-105A (1,832 pCi/L).
- Tritium concentrations in the wells screened in the Upper Dolomite ranged from less than the MDC (<193 pCi/L) to 7,535 pCi/L. The highest concentrations were detected down-gradient (east) of the Power Block, including MW-31S, MW-32S, MW-33S, MW-34S, MW-37S and MW-30S. Two detections above local background conditions were detected at well MW-30S (1,307 pCi/L) and well MW-37S (2,961 pCi/L), located north of the Power Block.
- Tritium concentrations in the wells screened in the Lower Dolomite ranged from less than the MDC (<193 pCi/L) to 3,271 pCi/L. The highest detections were located east/southeast of the Power Block, including wells MW-33D, MW-34D and MW-12D.
- No gamma emitting radionuclides were detected above MDC in any of the groundwater samples collected during the June, July/ August 2007 or the September/October 2007 monitoring events.

- Tritium concentrations in groundwater during the June, July and August and September/October 2007 monitoring events were below the Environmental Protection Agency's drinking water standard of 20,000 pCi/L.

Updated CSM

- Groundwater flow within the Till, Upper Dolomite and Lower Dolomite units at DBNPS is generally from west to east toward Lake Erie with groundwater discharge to the marshes and/or Lake Erie.
- Potential inadvertent releases from within the Power Block, including the Spent Fuel Pool, would migrate vertically down through the unsaturated zone to the water table. Potential releases from structures below ground could release tritium directly to the Upper or Lower Dolomite unit.
- Elevated detections in Upper Dolomite wells MW-31S and MW-32S are located on reported southwest to northeast fractures that project back to the Power Block.
- Tritium in groundwater will ultimately migrate into Lake Erie, where the concentrations will be diluted due to the volume of groundwater discharge versus the volume of water in the lake.
- Historic monitoring of Lake Erie by DBNPS indicates that there have been very few detections of tritium above local background conditions, and they are not likely to have been caused by groundwater contributions.

Based upon the above findings, FirstEnergy should further evaluate the hydrogeology and influence of plant features on site groundwater flow. In addition, tritium detections above local background conditions should be evaluated to establish a reliable monitoring well network for long-term monitoring.

1.0

INTRODUCTION

On behalf of FirstEnergy Nuclear Operating Company (FENOC), Environmental Resources Management (ERM) has prepared this *Groundwater Monitoring Well Installation and Monitoring Report* to document the development of a groundwater monitoring program at the Davis-Besse Nuclear Power Station (DBNPS) located in Oak Harbor, Ohio (Figure 1).

The groundwater monitoring program was implemented to comply with the Nuclear Energy Institute's (NEI) Groundwater Protection Initiative, dated August 2007. The Groundwater Protection Initiative was developed to enhance the detection, management and communication of inadvertent radiological releases to groundwater at nuclear power plants. As part of the initiative, nuclear power plants are expected to:

“Put in place a company/site-specific action plan(s) to help assure timely detection and effective response to situations involving inadvertent radiological releases in groundwater to prevent migration of licensed radioactive material off-site and quantify impacts on decommissioning.” (NEI, May 2006).

As a first step toward the completion of its action plan, FENOC hired ERM and Dade Moeller & Associates (Dade Moeller) in 2006 to conduct an evaluation of potential radiological sources and groundwater flow at DBNPS. Results of this study were presented in a report titled *Groundwater Flow Characteristics Report – Davis-Besse Nuclear Power Station, Oak Harbor, Ohio* (ERM, 16 January 2007). The January 2007 report provided an overview of DBNPS physical features, plant operating infrastructure, potential areas of radiological releases, available tritium data and site hydrogeology.

1.1

BACKGROUND

1.1.1

Site History

DBNPS consists of a pressurized water reactor unit that was constructed in the 1970s and went on-line in November 1977. The facility is located on a 954-acre parcel of land that abuts a National Wildlife Refuge and Lake Erie. An intake canal, which provides cooling and process water to

DBNPS, is located 250 feet east of the Power Block and is hydraulically connected to Lake Erie.

1.1.2

Prior Findings

The *Groundwater Flow Characteristics Report* presented a Conceptual Site Model (CSM) describing potential source areas, migration pathways and both human and environmental receptors at DBNPS. The CSM considered site physical features and included the following key findings:

1. Radiological areas of potential concern (APCs) at DBNPS, defined as locations where a release of radionuclides to groundwater has, or could occur, include the Power Block, Low Level Radiological Waste Storage Building, Dry Fuel Storage Area, Training Center Pond NPDES Outfall 002, Sewage Treatment Plants (abandoned and operating), NPDES Outfall 001, Sanitary Lagoon, North and South Settling Basins, Collection Box Discharge Pipe, Collection Box, Liquid Radwaste Discharge Line, Condensate Demineralized Water Storage Tank, Secondary Demineralized Water Storage Tank, Fire Storage Tank, and Service Building 4 Outfall (Figure 2).
2. Inadvertent releases from DBNPS have the potential to migrate vertically through the fill (structural or earthen), Glaciolacustrine unit, Till unit and Dolomite Bedrock.
3. The basement of buildings within the Power Block extends down into excavated portions of the Dolomite Bedrock. Potential inadvertent releases at depth from within the Power Block could discharge directly to the Dolomite Bedrock.
4. Regional groundwater flow is from west to east-northeast towards the marshes and Lake Erie. The ultimate discharge sink for groundwater is the marshes and Lake Erie east of the property.
5. Initial evaluation of site systems, geology and hydrogeology suggest a low potential for releases to groundwater at the site to adversely impact drinking water receptors given the likely up-gradient, distant location of potential receptors and the most probable migration pathway being from the Power Block to the marshes and Lake Erie.
6. Concentrations of tritium in groundwater would be diluted at the marsh and Lake Erie due to the large volume of surface water relative to the volume of groundwater discharge.

PURPOSE & SCOPE

The purpose of this *Groundwater Monitoring Well Installation and Monitoring Report* is to document the development of a groundwater monitoring program at DBNPS. The groundwater monitoring program is intended to assess whether any inadvertent release from the Power Block has the potential to migrate toward the adjacent marshes and/or Lake Erie or any other human or environmental receptor. The program was implemented using a phased approach, including the use of historic and new wells to collect groundwater samples. The intrusive investigations followed an outside-in, top-down approach to address gaps identified in the CSM.

The following activities were completed during development of the groundwater monitoring program:

- inventory of historic wells;
- preparation of groundwater field sampling plans;
- screening and confirmatory groundwater sampling of historic monitoring wells;
- installation of five well triplets and a water table well (i.e., 16 new wells);
- groundwater sampling of comprehensive monitoring well network (three rounds);
- survey of well reference measuring points for determination of groundwater elevations;
- evaluating groundwater elevations and flow directions; and
- evaluating groundwater monitoring results in the context of the hydrogeologic regime.

The groundwater monitoring program was developed using a team of contractors, including the following:

- BETA Laboratory - FirstEnergy's in-house provider of field personnel to collect groundwater samples;

- Bowser-Morner, Inc. – Well drilling service provider under contract with FirstEnergy to advance, construct and develop groundwater monitoring wells;
- ERM – FirstEnergy’s provider of groundwater and hydrogeologic consulting services. Dade Moeller provided data evaluation and technical support under subcontract to ERM; and
- MidWest Laboratory – Laboratory analytical service provider under contract to FirstEnergy to analyze groundwater samples.

1.3

REPORT ORGANIZATION

The remainder of this report is divided into the following sections:

- Section 2.0 – Methodology
- Section 3.0 – Results
- Section 4.0 – Updated Conceptual Site Model
- Section 5.0 – Key Findings
- Section 6.0 – References

For the purpose of this report, wells installed prior to 2007 will be referred to as “historic monitoring wells.” Wells installed in 2007 will be referred to as “new monitoring wells.”

2.0 METHODOLOGY

2.1 INVENTORY & MONITORING OF HISTORIC WELLS

2.1.1 *Well Inventory & Gauging*

On 9 and 10 May 2007, ERM conducted a site visit to inspect historic monitoring wells at DBNPS and to determine if those wells were potentially suitable for use as part of the plant groundwater monitoring program. The well inventory included a site walk to locate the monitoring wells and conduct the following activities:

- confirm the well location and designation against historic documents;
- collect spatial coordinates using a hand-held global positioning system device;
- assess the physical condition of the monitoring well;
- establish a measuring point for future depth to groundwater measurements;
- measure the well diameter, depth to groundwater and total depth; and
- attach an identification tag to the monitoring well.

Physical measurements and observations made during the well inventory were tabulated (Table 1) and compared to historic documentation. Results of the well inventory were used to determine which historic monitoring wells were appropriate to use in future groundwater monitoring activities.

2.1.2 *June 2007 Groundwater Monitoring Event*

Upon completion of the well inventory, a Groundwater Field Sampling Plan (FSP) (ERM, 8 June 2007) was prepared to outline procedures for groundwater sampling at select historic monitoring wells. The purpose of the FSP was to document the sampling locations, methodologies, analytical techniques and quality assurance/quality control (QA/QC) measures for the collection of representative groundwater samples.

The purpose of the June 2007 monitoring event was to conduct a preliminary (or screening) round to evaluate the potential for tritium and gamma emitting radionuclides in groundwater and to support final selection of the new monitoring well locations. Sampling locations represented a subset of the historic monitoring wells at the property. The rationale for selecting the wells is included in Table 2.

Groundwater samples were collected using low-flow methodologies as described in the FSP. Sampling depths were specified for each well as the mid point of the saturated screened interval. Quality Assurance/Quality-Control (QA/QC) procedures were specified for both the field and analytical program.

From 11 to 27 June 2007, BETA Laboratory personnel conducted groundwater monitoring at 17 historic monitoring wells: MW-1S, MW-1D, MW-7S, MW-12S, MW-15S, MW-15D, MW-18S, MW-18D, MW-20S, MW-20D, MW-26S, MW-26D, MW-30S, MW-32S, MW-32D, MW-33S, and MW-33D.

On 11 June 2007, prior to sampling, the depth to groundwater was measured in each well using an electric water level meter. Low-flow samples were collected using a peristaltic pump with disposable tubing.

During low-flow purging, geochemical field parameters were measured with an in-line flow-through-cell at regular intervals for stabilization criteria. Field parameters included temperature, specific conductivity, pH, dissolved oxygen (DO), and oxidation-reduction potential (ORP). The geochemical field parameters were recorded using a multi-parameter water quality instrument that was calibrated at the beginning of each day. Turbidity samples were collected upstream of the flow-through-cell and analyzed using a field turbidity meter. After stabilization of the field parameters, the flow-through-cell was disconnected and a groundwater sample was collected.

All field information and parameters were recorded on Low-Flow Groundwater Sampling forms and observations were recorded in a log book.

Water samples were collected in one-liter containers. No filtration or preservation was performed or required. All samples were packaged and shipped under chain-of-custody procedures to MidWest Laboratory of Northbrook, Illinois for analysis of Tritium (EPA Method 906.0) and gamma emitting radionuclides (EPA Method 901.1). Gamma isotopes included manganese-54 (Mn-54), iron-59 (Fe-59), cobalt-58 (Co-58), cobalt-

60 (Co-60), zinc-65 (Zn-65), zirconium-niobium-95 (Zr-Nb-95), cesium-134 (Cs-134), cesium-137 (Cs-137) and barium-lanthanum-140 (Ba-La-140).

QA/QC procedures during the June 2007 monitoring event included field and laboratory methods to assess the overall analytical results. QA/QC procedures included collection of the following additional samples (Table 3):

- Field duplicate (FD) – a QA/QC sample collected and analyzed to evaluate analytical precision. Two duplicate samples were collected in June 2007 (MW-12S and MW-20S). The duplicate samples were submitted for analysis; however, the duplicates were labelled with unique names (i.e., DBD-01 as a duplicate of sample MW-12S and DBD-02 as a duplicate of MW-20S), such that the laboratory was not aware of the sample's origin. (i.e., these were blind duplicate samples).
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) – a QA/QC sample collected and analyzed to evaluate the potential for matrix interferences on analytical accuracy. Matrix spike and matrix spike duplicate samples were collected at MW-26D by collecting two additional samples. The June 2007 samples were spiked at the laboratory with standards of 5,639 pCi/L of tritium, 59.3 pCi/L of cesium-134 and 66.3 pCi/L of cesium-137 and analyzed to compare the analytical results to the spike concentration.

2.2

JULY/AUGUST 2007 GROUNDWATER MONITORING EVENT

Upon receipt of the June 2007 groundwater monitoring results, an additional round of groundwater monitoring was performed to confirm the June results and to aid in finalizing the location of the proposed monitoring wells.

Groundwater samples were collected using low-flow methodologies as described in the June 2007 FSP. Sampling depths were specified for each well as the mid point of the saturated screened interval. QA/QC procedures developed for the June sampling event were followed.

From 31 July to 6 August 2007, BETA Laboratory personnel conducted groundwater monitoring at 14 historic monitoring wells:

- Re-sampled wells: MW-12S, MW-30S, MW-32S, MW-32D, MW-33S, MW-33D; and

- Additional sampled wells: MW-12D, MW-30D, MW-31S, MW-31D, MW-34S, MW-34D, MW-37S, and MW-37D.

On 31 July 2007, prior to sampling, the depth to groundwater was measured in each well using an electric water level meter. Low-flow samples were collected using a peristaltic pump with disposable tubing.

Purging, measurement of field parameters and sample collection for laboratory analysis in July/ August 2007 were performed in a similar manner as during the June 2007 sampling event (see Section 2.1.2). Samples were packaged and shipped under chain-of-custody procedures to MidWest Laboratory of Northbrook, Illinois for analysis of tritium (EPA Method 906.0).

QA/QC procedures during the July 2007 monitoring event included one field duplicate sample (MW-32S, see Table 3). The duplicate sample was submitted for analysis; however, it was labelled with a unique name, such that the laboratory was not aware of the sample origin (i.e., DBD-01 as a duplicate of sample MW-32S).

2.3 WELL INSTALLATION

2.3.1 Overview

The purpose of the well installation program was to characterize and confirm existing documentation of site subsurface geology and hydrogeology and to establish a reliable monitoring well network capable of evaluating the potential for inadvertent releases of radioactivity from the Power Block.

The new monitoring well network includes an up-gradient well triplet to represent background conditions and 13 wells located between the Power Block and Lake Erie to evaluate groundwater quality down-gradient and cross-gradient of the Power Block.

Prior to initiating the drilling activities, DBNPS conducted utility clearance activities at each of the proposed drilling locations. A site walkover was completed with Bowser-Morner, Inc. to verify access to each location with the drilling equipment. In addition, a kick-off meeting was conducted on 7 August 2007 to address site-specific logistics and health and safety issues.

2.3.2

Advancement of Soil Borings

From 8 to 29 August 2007, sixteen soil borings were advanced at DBNPS by Bowser-Morner, Inc. using a truck mounted Sonicor K-50 drill rig. Boring depths ranged from 28 to 90 feet below ground surface. The borings were advanced using sonic drilling technology, which is a dual-case drilling system that employs simultaneous high-frequency vibration and low speed rotation, coupled with down-pressure to advance the drill bit. The drilling method advances a uniform borehole while providing continuous, representative and relatively undisturbed core samples. The dual casing system was used at all locations and was advanced in 10-foot increments.

Each 10-foot core sample was collected within polyethylene sleeves allowing for visual logging and field screening. The sleeves were cut lengthwise to allow visual logging of grain size, degree of sorting, color and relative moisture content of the recovered materials. Field screening for low level gamma emitting radiation was performed using a Ludlum micro R meter scanned over the core sample. Field screening for total volatile organics was performed using a MiniRAE 2000 photoionization detector (PID).

Following completion of each soil boring, the inner and outer drill rods were thoroughly steam cleaned to remove residual solid and liquids from the drilling equipment. Drill cuttings were collected and containerized in 55-gallon drums and labeled to identify the origin and type of material (i.e., boring identification, soil and/or water). DBNPS managed the investigation derived waste by discharging the water into the South Settling Basin, an APC that has historically contained tritium, and placing the soil south of the Power Block. Borehole logs were prepared and are included in Appendix A.

2.3.3

Monitoring Well Construction

Each soil boring was completed as a monitoring well by installing two-inch inside diameter polyvinyl chloride (PVC) screen (0.010-inch slot) and riser. After installation of the PVC well materials, the outer casing of the sonic drilling system was slowly removed from the soil boring. The annular space between the PVC and the inner wall of the drill rod was filled as the drill rods were removed. The annular space around the PVC was filled as follows:

- Sand filter pack - coarse grained silica sand around the PVC screen.

- Bentonite seal - bentonite pellets above the silica sand.
- Grout seal - bentonite/cement slurry to ground surface.

Ten of the monitoring wells were capped with lockable expansion plugs and finished with flush mounted road boxes. The remaining six monitoring wells were capped either with a lockable expansion plug or a PVC slip cap and finished with a steel stick-up pipe secured in a concrete pad.

2.3.4 Monitoring Well Development

Following construction of the new wells, Bowser-Morner Inc. developed the wells to remove water and sediments introduced to the screen and riser during well construction. Well development was completed by removing groundwater using either a dedicated, disposable polyethylene bailer with nylon rope or a Whaler submersible pump. Non-dedicated equipment (pumps and tubing) was decontaminated between each well.

Prior to development, the volume of water inside the well was calculated, with a goal of removing 10 well volumes. Lower Dolomite wells MW-101C, MW-102C, MW-103C, and MW-104C purged dry several times during the development activities, resulting in the removal of less than 10 well volumes from these wells. Strong hydrogen sulfide odors were noted from the development water pumped from these wells. The presence of sulfide is believed attributed to the dissolution of naturally occurring gypsum and anhydrite minerals within the Lower Dolomite. Regionally, the occurrence of these minerals within the Dolomite Bedrock is attributed to high concentrations of hydrogen sulfide in water wells (Water Resources of Ottawa County Fact Sheet, Graham et al., 1998).

Groundwater from the development activities was containerized in either 55-gallon drums or 250-gallon totes and labeled to identify the origin of the water. Samples from the containers were collected and analyzed at DBNPS to support waste management.

2.4 SEPTEMBER/OCTOBER 2007 GROUNDWATER MONITORING ACTIVITIES

Upon completion of the new monitoring wells, a Groundwater Field Sampling Plan (ERM, 20 September 2007) was prepared to outline procedures for groundwater sampling at the new monitoring wells, as well as select historic monitoring wells. The purpose of the FSP was to

document the sampling locations, methodologies, analytical techniques, and QA/QC measures for the collection of representative groundwater samples.

Sampling locations identified in the September 2007 FSP represented all the new monitoring wells and select historic monitoring wells. The rationale for selecting the wells is included in Table 2. The list included wells screened in the Glaciolacustrine, Till, Upper and Lower Dolomite Bedrock.

Groundwater samples were collected using low-flow methodologies. Sampling depths were specified for each well as the mid point of the saturated screened interval. QA/QC procedures were implemented in both the field and analytical program.

The purpose of the September/October 2007 monitoring event was to evaluate if tritium and gamma emitting radionuclides associated with inadvertent releases from plant operations had migrated into groundwater at DBNPS. From 24 September to 10 October 2007, BETA Laboratory personnel conducted groundwater monitoring at 32 monitoring wells:

- Historic monitoring wells: MW-12S, MW-12D, MW-15S, MW-15D, MW-20S, MW-20D, MW-23S, MW-30S, MW-30D, MW-31S, MW-31D, MW-33S, MW-33D, MW-35S, MW-35D, and MW-37S; and
- New monitoring wells: MW-100A, MW-100B, MW-100C, MW-101A, MW-101B, MW-101C, MW-102A, MW-102B, MW-102C, MW-103A, MW-103B, MW-103C, MW-104A, MW-104B, MW-104C, and MW-105A.

On 24 September 2007, prior to sampling, the depth to groundwater was measured in each well using an electric water level meter. Low-flow samples were collected using a peristaltic pump with disposable tubing or a non-dedicated bladder pump.

Purging, measurement of field parameters and sample collection for laboratory analysis in September/October 2007 were performed in a similar manner as during the June 2007 sampling event (see Section 2.1.2). Wells MW-101C and MW-103C were purged dry during low-flow pumping. Field parameters at these wells were collected during the purging activities and the groundwater sample was collected after the groundwater level had recovered to within 90 percent of the original level.

QA/QC procedures during the September/October 2007 monitoring event included field and laboratory methods to assess the overall analytical results. QA/QC procedures included collection of the following additional samples (Table 3):

- Field Duplicate - duplicate samples were collected at four wells (MW-12D, MW20S, MW-31S, and MW-103B) to evaluate laboratory analytical precision. The duplicate samples were submitted for the same analysis as the actual samples with unique names such that the laboratory was not aware of the samples' origin. (i.e., DBD-01 as a duplicate of sample MW-12D, DBD-02 as a duplicate of sample MW-20S, DBD-03 as a duplicate of sample MW-31S, and DBD-04 as a duplicate of sample MW-103A).
- Matrix Spike/Matrix Spike Duplicate - two additional samples were collected at MW-30S and MW-100A and spiked at the laboratory with a standard of 17,185 and 27,496 pCi/L of tritium and 65.6 and 98.4 pCi/L of cesium-137.
- Laboratory Duplicate - outside of the FSP requirements, the laboratory collected and analyzed split samples to evaluate laboratory precision of tritium analysis. The laboratory duplicate samples (i.e., MW-33S duplicate and MW-102A duplicate) were collected by splitting samples from MW-33S and MW-102A, respectively.
- Equipment Blank - a rinseate sample was collected after decontaminating the bladder pump at MW-103C to evaluate the effectiveness of decontamination procedures and the potential for cross-contamination between wells introduced by the sampling equipment.

2.5

SURVEYING

Select historic wells (MW-14D, MW-18S/D, MW-19S/D, MW-21S/D, MW-30S/D, MW-38S/D and MW-39S/D) and all new monitoring wells were surveyed on 11 and 12 December 2007 by B.E.C. Associates, Inc., a professional survey company retained by ERM. Elevation data were collected relative to NAVD 1929 sea level vertical datum. Historic wells were selected for elevation surveying was based on observed physical alterations to the well casings during the initial inspection. Documented survey data in DBNPS files was used for the remainder of the historic wells.

DATA USABILITY ASSESSMENT

An assessment of the June, July/August 2007 and September/October 2007 analytical data was performed to determine the usability of the groundwater data for the intended purpose of the monitoring event. The usability of groundwater data was evaluated by initially conducting a review of the Low-Flow Groundwater Sampling Forms against methods outlined in the FSP in order to assess deviations from the original FSP. Secondly, the analytical results were evaluated in terms of data quality standards termed "PARCCs" parameters (i.e., precision, accuracy, representativeness, comparability and completeness of the data).

Additional data review and verification included a statistical analysis of the radiological data reported by MidWest Laboratory to determine the range in the local background concentration of tritium in groundwater at Davis-Besse. The need for a statistical evaluation was based on the detection of low level tritium concentrations reported by the laboratory and follows industry guidance (EPRI, 2005).

3.0

RESULTS

3.1

SITE GEOLOGY

The surficial geology beneath the DBNPS property is characterized as Glaciolacustrine and Till units underlain by Dolomite Bedrock. Although not encountered in the new boreholes, a layer of fill is reportedly present within the area excavated during construction of the Power Block.

Based on field observations during the recent drilling activities as well as information presented in historic reports, the relative thickness and elevation of geologic units encountered at DBNPS are summarized below.

Summary of Geologic Units at DBNPS

<i>Unit</i>	<i>Approximate Depth Interval(s) Below Ground Surface (feet below ground)</i>	<i>Approximate Elevation Range (feet above mean sea level)</i>
Glaciolacustrine	0 - 10 feet	574 feet - 564 feet
Till	10 feet - 20 feet	564 feet - 554 feet
Dolomite Bedrock	20+ feet	554 feet and below

The Glaciolacustrine unit is characterized as brown silt with some sand and clay. This formation consists of sediments of a complex, unconsolidated nature that were deposited within a temporary lake formed during the recession of glacial ice from Lake Erie. The underlying Till unit is defined as a brown to dark gray silty clay. The surfaces of the Glaciolacustrine and Till deposits slope towards Lake Erie.

Beneath the Glaciolacustrine and Till units is the Dolomite Bedrock. This bedrock unit consists of argillaceous dolomite that has been subdivided into a Massive Dolomite and a Laminated Dolomite. The Massive Dolomite is approximately 10 feet in thickness, hard, finely grained, and present approximately 10 feet below the ceiling of the Dolomite. The Laminated Dolomite is encountered above and below the Massive Dolomite and includes thin layers of interbedded dolomite, gypsum, anhydrite and shale. Bedrock joints oriented to the northeast (N45°E) and northwest (N50°W) were reportedly observed in the bedrock during

excavation of the Power Block. Beds within the Dolomite Bedrock have a natural dip of less than one degree to the south.

3.2

HISTORIC WELL INVENTORY

Table 1 and Figure 2 present a summary of historic monitoring wells evaluated during the well inventory. The monitoring wells were originally installed during construction of DBNPS to assess the effectiveness of a dewatering system that operated during plant construction. The historic wells were installed as couplets with screened in the Upper and Lower Dolomite and are located north, east, south and west of the Power Block. The historic wells consist of 3-inch diameter, 20-foot screen wells installed at depths varying between 29.37 and 49.65 feet (Upper Dolomite wells) and from 72 and 86 feet (Lower Dolomite wells). Based on historic documentation, the Upper and Lower Dolomite wells are separated by the Massive Dolomite unit.

The following monitoring wells were not located during the well inventory and therefore were not evaluated further: MW-8S, MW-8D, MW-9S, MW-9D, MW-10S, MW-10D, MW-13S, MW-13D, MW-16S, MW-16D, MW-17S, MW-17D, MW-24S, MW-24D, MW-25S, MW-25D, MW-27S, MW-27D, MW-28S, MW-28D, MW-29S, MW-29D, MW-36S, and MW-36D.

3.3

NEW MONITORING WELLS

A total of 16 monitoring wells were installed at five locations at DBNPS to assess existing data gaps and to increase the reliability of the historic well network (Figure 2). The new wells were located to characterize groundwater quality up-gradient and down-gradient of the Power Block. Five well triplets and a single well were installed. Each triplet is characterized by three individual monitoring wells that are screened across a specific target depth interval at each location: Base of Till, Upper Dolomite, and Lower Dolomite.

The following table summarizes the newly installed monitoring wells and their location relative to the Power Block.

Summary of New DBNPS Monitoring Wells

Well ID	Location/Hydraulic Position Relative to Power Block	Target Depth of Well Screen
MW-100A	West/Up-gradient	Base of Till
MW-100B		Upper Dolomite
MW-100C		Lower Dolomite
MW-101A	East/Down-gradient	Base of Till
MW-101B		Upper Dolomite
MW-101C		Lower Dolomite
MW-102A	Northeast/Down and cross-gradient	Base of Till
MW-102B		Upper Dolomite
MW-102C		Lower Dolomite
MW-103A	Northeast/ Down and cross-gradient	Base of Till
MW-103B		Upper Dolomite
MW-103C		Lower Dolomite
MW-104A	Northeast/ Down and cross-gradient	Base of Till
MW-104B		Upper Dolomite
MW-104C		Lower Dolomite
MW-105A	Northeast/ Down-gradient	Glaciolacustrine / Base of Till

Table 1 includes a summary of well construction details for the new and historic monitoring wells at DBNPS. Micro R and PID field meters did not yield any increased detections when scanned over the core samples during the drilling activities. Borehole logs and well construction diagrams for the new monitoring wells are included in Appendix A.

3.4

GROUNDWATER FLOW

Table 4 presents a summary of depth to groundwater measurements and calculated groundwater elevations during the well inventory and groundwater monitoring events. During each monitoring event, the elevation of groundwater was generally higher than the elevation of surface water in Lake Erie, indicating regional groundwater flow is from west to east at DBNPS.

ATTACHMENT 71122.03

INSPECTION AREA: Radiological Environmental Monitoring Program (REMP) And Radioactive Material Control Program

CORNERSTONE: Public Radiation Safety

INSPECTION BASES: This inspection area verifies aspects of the Public Exposure cornerstone for which there are no performance indicators to measure performance. The REMP is required by Criterion 64 of Appendix A to 10 CFR Part 50. The REMP supplements the effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation in the environment are in agreement with the values predicted by the radioactive effluent monitoring program. The licensee is required to implement the REMP in accordance with its Technical Specifications and/or Offsite Dose Calculation Manual, which are based on the design objectives contained in Appendix I of 10 CFR Part 50, as required by 10 CFR 50.34a. The radioactive material control program verifies that the licensee maintains a program to ensure that licensed radioactive material is controlled in accordance with the requirements of 10 CFR Part 20.

LEVEL OF EFFORT: Inspect biennially

71122.03-01 INSPECTION OBJECTIVES

01.01 To ensure that the REMP verifies the impact of radioactive effluent releases to the environment and sufficiently validates the integrity of the radioactive gaseous and liquid effluent release program.

01.02 To verify that the REMP is implemented consistent with the licensee's Technical Specifications (TS) and/or Offsite Dose Calculation Manual (ODCM) to validate that the radioactive effluent release program meets the design objective contained in Appendix I to 10 CFR Part 50.

01.03 To ensure that the licensee's surveys and controls are adequate to prevent the inadvertent release of licensed materials into the public domain.

02.01 Inspection Planning and In-Office Inspection

- a. Review the most current Annual Environmental Monitoring Report and licensee assessment results to verify that the REMP was implemented as required by TS and the ODCM. Review the report for changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, interlaboratory comparison program, and analysis of data. (Refer to the NRC Branch Technical Position, Revision 1, "An Acceptable Radiological Environmental Monitoring Program," for additional information)
- b. Review the ODCM to identify environmental monitoring stations. Review licensee self assessments, audits, licensee event reports, and interlaboratory comparison program results.
- c. Review FSAR for information regarding the environmental monitoring program and meteorological monitoring instrumentation.
- d. Review the scope of the licensee's audit program to verify that it meets the requirements of 10 CFR 20.1101(c).

02.02 Onsite Inspection

- a. Walk-down between 20 and 30 percent of the air sampling stations and 5 and 10 percent of the thermoluminescence dosimeter (TLD) monitoring stations to determine whether they are located as described in the ODCM and to determine the equipment material condition.
- b. Observe the collection and preparation of a variety of environmental samples (e.g., ground and surface water, milk, vegetation, sediment, and soil). Verify that environmental sampling is representative of the release pathways as specified in the ODCM and that sampling techniques are in accordance with procedures.
- c. Based on direct observation and review of records, verify that the meteorological instruments are operable, calibrated, and maintained in accordance with guidance contained in the FSAR, NRC Safety Guide 23, and licensee procedures. Verify that the meteorological data readout and recording instruments in the control room and at the tower are operable. Compare readout data (i.e., wind speed, wind direction, and delta temperature) in the control room and at the meteorological tower to identify if there is any line loss differences.
- d. Review each event documented in the Annual Environmental Monitoring Report which involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement for the cause and corrective actions. Conduct a review of the

licensee's assessment of any positive sample results (i.e., licensed radioactive material detected above the lower limits of detection (LLDs). Review the associated radioactive effluent release data that was the likely source of the released material.

- e. Review any significant changes made by the licensee to the ODCM as the result of changes to the land census or sampler station modifications since the last inspection. Review technical justifications for any changed sampling locations. Verify that the licensee performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.
- f. Review the calibration and maintenance records for up to 5 air samplers and composite water samplers.
- g. Review calibration records for the environmental sample radiation measurement instrumentation (i.e., count room). Verify that the appropriate detection sensitivities with respect to TS/ODCM are utilized for counting samples (i.e., the samples meet the TS/ODCM required LLDs). Review quality control charts for maintaining radiation measurement instrument status and actions taken for degrading detector performance. If the licensee uses a vendor laboratory to analyze the REMP samples, review the results of the vendor's quality control program including the interlaboratory comparison program to verify the adequacy of the vendor's program. Review any audits and technical evaluations the licensee performed on the vendor's program.
- h. Review the results of the licensees' interlaboratory comparison program to verify the adequacy of environmental sample analyses performed by the licensee. Review the licensee's quality control evaluation of the interlaboratory comparison program and the corrective actions for any deficiencies. If applicable, review the licensee's determination of any bias to the data and the overall effect on the REMP.
- i. Review QA audit results of the program to determine whether the licensee met the TS/ODCM requirements.

02.03 Unrestricted release of material from the Radiologically Controlled Area (RCA)

- a. Observe several locations where the licensee monitors potentially contaminated material leaving the RCA, and inspect the methods used for control, survey, and release from these areas. When possible, observe the performance of personnel surveying and releasing material for unrestricted use to verify that the work is performed in accordance with plant procedures.
- b. Verify that the radiation monitoring instrumentation is appropriate for the radiation types present (reference DAW radio-chemical analysis results obtained in Section 02.03) and was calibrated with appropriate radiation sources.

- c. Review the licensee's criteria for the survey and release of potentially contaminated material. Verify that there is guidance on how to respond to an alarm which indicates the presence of licensed radioactive material.

NOTE: 10 CFR Part 20 does not contain release limits for the release of contaminated material to unrestricted areas; thus, the licensee's criteria should be that no detectable licensed radioactive material (radioactive gaseous and liquid effluents excepted) is released for unrestricted use or as waste into an unrestricted area.

- d. Review the licensee's equipment to ensure the radiation detection sensitivities are consistent with the NRC guidance contained in IE Circular 81-07 and IE Information Notice 85-92 for surface contamination and HPPOS-221 for volumetrically contaminated material. If applicable, as discussed in HPPOS-250, verify that the licensee performs radiation surveys to detect radionuclides that decay via electron capture.
- e. Review the licensee's procedures and records to verify that the radiation detection instrumentation is used at its typical sensitivity level based on appropriate counting parameters (i.e., counting times and background radiation levels). Verify that the licensee has not established a "release limit" by altering the instrument's typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high radiation background area.

02.04 Identification and Resolution of Problems

- a. Review the licensee's Licensee Event Reports, Special Reports, audits, and self assessments related to the radiological environmental monitoring program performed since the last inspection. Determine if identified problems are entered into the corrective action program for resolution.
- b. Review corrective action reports affecting environmental sampling, sample analysis, or meteorological monitoring instrumentation. Interview staff and review documents to determine if the following activities are being conducted in an effective and timely manner commensurate with their importance to safety and risk:
 - 1. Initial problem identification, characterization, and tracking.
 - 2. Disposition of operability/reportability issues.
 - 3. Evaluation of safety significance/risk and priority for resolution.
 - 4. Identification of repetitive problems.
 - 5. Identification of contributing causes.
 - 6. Identification and implementation of effective corrective actions.
 - 7. Resolution of non-cited violations (NCVs) tracked in corrective action system(s).
 - 8. Implementation/consideration of risk significant operational experience feedback.

Emphasis should be placed on ensuring problems are identified, characterized, prioritized, entered into a corrective action, and resolved.

- c. For repetitive deficiencies or significant individual deficiencies in problem identification and resolution identified above, determine if the licensee's self-assessment activities are also identifying and addressing these deficiencies.

71122.03-03 RESOURCE ESTIMATE

The estimated hours to complete this procedure ranges from a minimum of 30 hours to a maximum of 35 hours, with a base of 32 hours.

71122.03 - 04 COMPLETION STATUS

Inspection of the minimum sample size will constitute completion of this procedure in the Reactor Programs System (RPS). That minimum sample size consists of 10 samples determined as follows:

Section 02.01 a, b, c, d	1 sample
Section 02.02 a	1 sample
Section 02.02 b	1 sample
Section 02.02 c	1 sample
Section 02.02 d	1 sample
Section 02.02 e	1 sample
Section 02.02 f, g, h, i	1 sample
Section 02.03 a	1 sample
Section 02.03 b, c, d, e	1 sample
Section 02.04 a, b, c	1 sample

END

Surface Water¹ and Groundwater Elevations

<i>Date</i>	<i>Range in Surface Water Elevation Lake Erie (feet above sea level)</i>	<i>Range in Groundwater Elevations in the Site Monitoring Wells</i>
9 May 2007	571.80 - 572.48	570.54 - 575.91
11 June 2007	571.72 - 571.91	570.52 - 574.79
31 July 2007	571.10 - 571.42	569.97 - 573.90
24 September 2007	570.87 - 571.17	517.62 - 573.96

¹National Oceanic and Atmospheric Administration station 9063079 in Marblehead, OH

As indicated in the above table, groundwater elevations below the elevation of surface water in Lake Erie were observed during each monitoring event. The occurrence of low groundwater elevations likely reflects site-specific conditions at DBNPS that complicate the ability to evaluate groundwater elevations and precise flow directions.

Complicating factors include the presence of a grout curtain, the flow of groundwater within discrete fractures in bedrock, the large area of excavated bedrock beneath the Power Block and the high degree of mineralized groundwater and associated low yield observed in the new Lower Dolomite wells. An additional source of uncertainty is the usability of historic elevation survey data that were used to calculate groundwater elevations from the historic wells.

Low groundwater elevations were measured at Lower Dolomite wells MW-101C, MW-102C, MW-103C and MW-104C, located east and northeast of the Power Block. As previously indicated, each of these wells demonstrated a low yield during the well development activities and contained high levels of hydrogen sulfide gas. The use of expansion plugs may be inadvertently trapping sulfide gas inside the wells and around the well screen, thereby limiting the screens ability to communicate with the Lower Dolomite. Future modifications to the expansion plugs to allow venting of the sulfide gas will be evaluated in effort to obtain more accurate groundwater elevation data from these wells.

Figures 3, 4, and 5 present groundwater elevations for the Till, Upper Dolomite and Lower Dolomite, respectively, during the September 2007 monitoring event. Groundwater elevation contours were not developed due to the complicating site-specific factors and their potential to impact groundwater flow. However, groundwater flow directions at DBNPS

within the Till, Upper Dolomite and Lower Dolomite can be evaluated by comparing groundwater elevations in new across the site.

Groundwater elevations in Till wells MW-100A, MW-101A, MW-102A, MW-103A and MW-104A are presented in Figure 3. The highest groundwater elevation in the Till was 573.91 feet measured up-gradient (i.e., west) of the Power Block at MW-100A. The lowest groundwater elevation was measured at MW-105A at 568.73 feet, which is below the elevation of surface water in Lake Erie. Based on the distribution of groundwater elevations, groundwater flow in the Till is from west to east across the site. Approximate flow directions in the Till (Figure 3) are orientated perpendicular to the shoreline of Lake Erie.

Groundwater elevations in the Upper Dolomite are presented in Figure 4. The highest groundwater elevation in the Upper Dolomite was 573.96 feet measured up-gradient (i.e. west) of the Power Block at MW-100B. The lowest groundwater elevations in the Upper Dolomite were located northeast of the Power Block (MW-31S at 571.08 feet) and southeast of the Power Block (MW-12S at 570.98 feet). Based on the distribution of groundwater elevations, groundwater flow in the Upper Dolomite is from west to east across the site. Approximate flow directions in the Upper Dolomite (Figure 4) are orientated perpendicular to the shoreline of Lake Erie.

Groundwater elevations in the Lower Dolomite are presented in Figure 5. The highest groundwater elevation in the Lower Dolomite was 573.56 feet measured up-gradient (i.e. west) of the Power Block at MW-100C. In general, lower groundwater elevations in the Lower Dolomite were located east of the Power Block. Based on the distribution of groundwater elevations, groundwater flow in the Lower Dolomite is from west to east across the site. Approximate flow directions in the Lower Till (Figure 5) are orientated perpendicular to the shoreline of Lake Erie.

Groundwater elevations decreased in site wells from May to July, and again from July to September. This trend mimics the decline in elevation of surface water in Lake Erie over the same period, signifying that the marshes and/or Lake Erie are the discharge boundary for groundwater.

Comparison of groundwater elevations between the Till and Upper Dolomite allows for assessment of vertical groundwater flow gradients. Using data from the new monitoring wells, an upward flow gradient is observed from the Upper Dolomite to the Till unit. As previously indicated, the elevation of groundwater in all three units is higher than the elevation of surface water in Lake Erie (except where anomalies are noted)

further indicating that groundwater within all three units is ultimately discharging to the marshes and/or Lake Erie.

3.5 GROUNDWATER QUALITY

3.5.1 Groundwater Field Parameters

Groundwater field parameters collected at the time of groundwater sampling in June 2007, July/August 2007 and September/October 2007 are summarized in Table 5. A summary of the field parameter data is presented below.

- Temperature - Groundwater temperatures ranged from 13.6 to 25.6 degrees Celsius (°C). In general the highest temperatures were measured in wells located directly down-gradient of the Power Block. The highest temperatures were observed at MW-34S/D (25.6, 24.1°C), MW-33S/D (25.5, 25.2°C), and MW-31S/D (24.5, 23.1°C). Groundwater temperatures in other areas were below 20°C.
- Specific conductivity - Groundwater specific conductivity ranged from 113 uS/cm to values greater than 10,000 uS/cm. The highest specific conductance values (i.e., greater than 50,000 uS/cm) were measured in Lower Dolomite wells MW-101C, MW-102C, MW-103C and MW-104C. As indicated earlier, these wells were noted with high hydrogen sulfide gas, low yield and low groundwater elevations. The high specific conductance measured at these wells relative to other wells further suggests that the well screens at these four locations have limited connection to the Lower Dolomite.
- Dissolved oxygen (DO) - Several DO measurements were rejected from the monitoring events due to probe interference with hydrogen sulfide. Accepted DO levels in groundwater ranged from 0.04 to 4.24 milligrams per liter (mg/L). The reported odors of sulfide are indicators of anaerobic and depleted oxygen conditions.
- pH - The pH of groundwater ranged from 6.0 to 8.8 standard pH units. The limited variations in pH values are most likely due to the influence of the Dolomite Bedrock. Dolomite is a carbonate rock and is anticipated to buffer pH changes in groundwater.
- Oxidation Reduction Potential - ORP values ranged from -368 to 87 millivolts (mV). ORP values were generally below 50 mV in all of

the wells, indicating that site groundwater is subject to reducing conditions (anaerobic). A trend shows that values decrease with depths.

- Turbidity - With the exception of wells MW-101C (798), MW-102C (10) and MW-104C (38), the turbidity of groundwater was low (i.e., less than 10 nephelometric turbidity units). High turbidity values at MW-101C, MW-102C and MW-104C are consistent with the high specific conductance at these wells and the well screens limited ability to communicate with the Lower Dolomite.

3.5.2

Analytical Results

Data Summary

Groundwater analytical results from the June, July/ August 2007, and the September/October 2007 groundwater monitoring event are summarized in Table 6. Figure 5 presents a summary of the June, July/ August 2007 tritium results, while Figure 6 presents a summary of the September/October 2007 tritium results. Appendix C and Appendix D include an assessment of the usability of the groundwater analytical data for the June, July/ August, and September/October 2007 monitoring events, respectively. As indicated in Appendices B and C, the analytical data presented in Table 6 meet the data quality objectives in the FSPs and are usable for the intended purpose of the groundwater monitoring program. Appendix D also includes a statistical evaluation to determine the range in local background concentrations. Laboratory analytical reports are included in Appendix E.

Local Background Conditions

As presented in Appendix C, reported tritium concentrations between 178 pCi/L and 348 pCi/L represent statistically insignificant activity at the 95% confidence level. Therefore, values at or below 348 pCi/L were considered to be representative of local background conditions. Factors influencing local background conditions may include the historic atmospheric bomb testing program, cosmic ray interactions in the earth's atmosphere and localized washout from continuous and batch gaseous releases from DBNPS.

June and July/August 2007 Results

Analytical results of tritium samples collected in June 2007 ranged from less than the minimum detectable concentration (MDC, i.e., <330 pCi/L)

to 5,838 pCi/L (MW-32S). Tritium detections during the July/ August 2007 confirmation round ranged from 108 pCi/L (MW-31D) to 7,535 pCi/L (MW-32S). No gamma emitting radionuclides were detected above their respective MDCs.

Tritium concentrations detected above the 348 pCi/L background value were located primarily in monitoring wells east of the Power Block. In the Upper Dolomite, the highest concentrations were present east of the Power Block, including MW-31S, MW-32S, MW-33S, and MW-34S. Elevated detections above local background were also measured in the Upper Dolomite north of the Power Block at well MW-30S (1,307 pCi/L) and well MW-37S (2,961 pCi/L).

In the Lower Dolomite unit, the highest detections were located east/southeast of the Power Block, including wells MW-33D, MW-34D and MW-12D.

September/October 2007 Results

In September/October 2007, tritium concentrations ranged from less than the MDC (149 pCi/L) to 3,149 pCi/L (MW-31S). The concentrations of tritium in new wells MW-100A, MW-100B and MW-100C, which are located hydraulically up-gradient of the Power Block, were <193 pCi/l, <193 pCi/L and <149 pCi/l, respectively. No gamma emitting radionuclides were detected above their respective MDCs in any of the groundwater samples collected during the September/October 2007 sampling event.

Concentrations above local background in the Till were detected down-gradient (i.e., northeast) of the Power Block, including MW-102A (387 pCi/L, Till Unit), MW-103A (495 pCi/L, Till Unit), and MW-105A (1,832 pCi/L, Glaciolacustrine/Till Unit).

Tritium concentrations above local background in the Upper Dolomite were detected north of the Power Block in wells MW-30S and MW-37S, consistent with the June and July/ August 2007 events. The highest concentrations in the Upper Dolomite were detected east/northeast of the Power Block including wells MW-31S and MW-33S. Elevated tritium in the Upper Dolomite was not detected in new monitoring wells MW-102B, MW-103B and MW-104B, located to the northeast of MW-31S/D.

For the Lower Dolomite, the highest concentrations above local background were detected in wells MW-12D, MW-15D and MW-33D, located east/southeast of the Power Block. Tritium was not detected

above local background in any of the new monitoring wells east of the Power Block within the Lower Dolomite (i.e., MW-101C, MW-102C, MW-103C and MW-104C). As previously indicated, groundwater at these wells may not be connected to the Lower Dolomite due to the presence of hydrogen sulfide gas.

Comparison to Drinking Water Standards

Tritium concentrations in groundwater during the June, July and August and September/October 2007 monitoring events were below the Environmental Protection Agency's drinking water standard of 20,000 pCi/L.

3.5.3 *Tritium Source Assessment*

As indicated in the January 2007 *Groundwater Flow Characteristics Report* (ERM, 16 January 2007), potential sources of the elevated tritium detected in groundwater may be associated with plant operations in the following areas and/or documented historic liquid releases (Figure 2):

- Power Block - consisting of potential sources within the Reactor Containment, Auxiliary Building, Circulating Water Pump House, Turbine Building and Borated Water Storage Tank.
- Spent Fuel Pool, Fuel Transfer Canal and Cask Pit - as outlined in the investigation summary of DBNPS Condition Report # 04-01719, several instances of leakage from the Spent Fuel Pool have been recorded. Since the elevation of the pool is from 563.3 to 601.5 feet above sea level, leakage from the Spent Fuel Pool and/or interconnected Fuel Transfer Canal and Cask Pit could potentially release tritiated water to the structural backfill surrounding the Power Block or to the Upper Dolomite.
- Condensate Demineralizer Tank Discharge Line - as documented in the DBNPS 10 CFR 50.75(g) file, in May 1990 a break in the discharge line exiting the Condensate Demineralizer Polisher Tank was discovered east of the Power Block. Contaminated resin was released to soil at the connection between the Condensate Demineralizer Backwash Receiver Tank discharge line and a 10-inch pipe that conveyed the resin to South Settling Pond.
- Collection Box - as documented in the DBNPS 10 CFR 50.75(g) file, approximately 12,000 gallons of water was spilled to the ground

adjacent to the Collection Box in 1997. It was estimated that the concentration of tritium in the release water was 6,850 pCi/L.

- Hydrogen Addition System - as documented in the DBNPS 10 CFR 50.75(g) file, primary grade water was spilled onto the ground near the Borated Water Storage Tank while draining the Hydrogen Addition System in 1991.

The spatial distribution of tritium in groundwater and groundwater flow patterns can be used to update the CSM regarding the potential inadvertent release, fate and transport of tritium at DBNPS. The CSM was originally presented in the *Groundwater Flow Characteristics Report - Davis-Besse Nuclear Power Station, Oak Harbor, Ohio*.

Groundwater flow within the Till, Upper Dolomite and Lower Dolomite units at DBNPS is from west to east toward Lake Erie. Higher groundwater elevations within these units compared to the elevation of surface water in Lake Erie indicates that groundwater discharges to the marshes and/or Lake Erie.

Potential inadvertent releases from within the Power Block, including the Spent Fuel Pool, would migrate vertically down through the unsaturated zone to the water table. Upon encountering the water table, tritium would be transported laterally through the Till in an easterly direction towards Lake Erie. Potential releases below the water table could release tritium directly to the Upper or Lower Dolomite unit.

Reported mapping of jointing and fractures on the upper surface of the Dolomite Bedrock indicated orientations southwest to northeast and a secondary orientation from southeast to northwest. These fractures represent the direction of potential preferential migration pathways within the Dolomite Bedrock. Elevated detections in Upper Dolomite wells MW-31S and MW-32S are located on fracture projections that trace back (i.e., southwest) to the Power Block.

Tritium in groundwater will ultimately migrate into Lake Erie, where the concentrations will be diluted due to the volume of groundwater discharge versus the volume of water in the lake. This is supported by DBNPS Radiological Effluent Monitoring Program (REMP) data that indicates tritium levels typically below 330 pCi/L in surface water samples from Lake Erie.

The key findings from the groundwater investigation include the following:

Geology

- The surficial geology beneath the DBNPS consists of Glaciolacustrine and Till units. The Glaciolacustrine unit is characterized as cohesive, brown silt with some sand and clay. The Till is characterized as brown to dark-gray, silty clay.
- Beneath the Till is Dolomite Bedrock, subdivided into a Laminated Dolomite and a Massive Dolomite. The Laminated Dolomite, which is encountered above and below the Massive Dolomite, contains thin layers of interbedded dolomite, gypsum, anhydrite and shale. The Massive Dolomite is approximately 10 feet thick, hard, finely grained, and located approximately 10 feet below the top of the Dolomite.

Historic Well Inventory

- A total of 54 wells (27 couplets) were located and inspected during the well inventory and 24 wells (12 couplets) could not be found. Each well couplet consists of a shallow and deep well within the Dolomite Bedrock. The shallow bedrock well is screened within the Upper Dolomite and the deeper bedrock well is screened in the Lower Dolomite. The Massive Dolomite unit separates wells screened within the Upper and Lower Dolomite.
- The historic wells, by themselves, were not sufficient to create an effective groundwater monitoring program at DBNPS because they did not provide adequate lateral and vertical coverage. In addition, due to the age of the wells, their construction quality and subsurface conditions are not known.

Groundwater Flow

- The ability to develop groundwater elevation contours and flow patterns is complicated by several factors, including the presence of a grout curtain, the flow of groundwater within discrete fractures in bedrock, the large area of excavated bedrock beneath the Power

Block and the high degree of mineralized groundwater and associated low yield observed in the new Lower Dolomite wells. An additional uncertainty is the usability of historic elevation survey data that were used to calculate groundwater elevations from the historic wells.

- Based on the distribution of groundwater elevations, groundwater flow in the Till, Upper Dolomite and Lower Dolomite units is from west to east across the site.
- The ultimate discharge point for groundwater in the Till, Upper Dolomite and Lower Dolomite is the marshes and/or Lake Erie east of the Power Block.

Groundwater Quality

- Strong hydrogen sulfide odors were noted in site groundwater, particularly new Lower Dolomite wells MW-101C, MW-102C, MW-103C and MW-104C located east of the Power Block. The hydrogen sulfide is believed to be naturally occurring and caused by the weathering of gypsum and anhydrite minerals. Groundwater field parameters at these wells are characterized by high specific conductance, low ORP and high turbidity water.
- High hydrogen sulfide gas levels at wells MW-101C, MW-102C, MW-103C and MW-104C may be inadvertently trapped due to the use of expansion plugs at these wells. The sulfide gas may limit the ability for the well screen to communicate with the Lower Dolomite. Future modifications to the expansion plugs to allow venting of the sulfide gas will be evaluated in effort to obtain more accurate groundwater elevation data from these wells.
- Reported concentrations of tritium in groundwater between 178 pCi/L and 348 pCi/L represent statistically insignificant activity at the 95% confidence level and are considered representative of local background conditions. Factors influencing local background condition may include the historic atmospheric bomb testing program, cosmic ray interactions in the earth's atmosphere and localized washout from continuous and batch gaseous releases from DPNBS. Reported values above 348 pCi/L represent concentrations that are statistically greater than local background conditions.

- Tritium concentrations above the 348 pCi/L background value were located primarily in monitoring wells east of the Power Block.
- Tritium concentrations in the wells screened in the Till ranged from less than the minimum detectable concentration (MDC; <193 pCi/L) to 1,832 pCi/L. The highest concentrations were detected down-gradient (northeast) of the Power Block, including MW-102A (387 pCi/L), MW-103A (495 pCi/L), and MW-105A (1,832 pCi/L).
- Tritium concentrations in the wells screened in the Upper Dolomite ranged from less than the MDC (<193 pCi/L) to 7,535 pCi/L. The highest concentrations were detected down-gradient (east) of the Power Block, including MW-31S, MW-32S, MW-33S, MW-34S, MW-37S and MW-30S. Two detections above local background conditions were detected at well MW-30S (1,307 pCi/L) and well MW-37S (2,961 pCi/L), located north of the Power Block.
- Tritium concentrations in the wells screened in the Lower Dolomite ranged from less than the MDC (<193 pCi/L) to 3,271 pCi/L. The highest detections were located east/southeast of the Power Block, including wells MW-33D, MW-34D and MW-12D.
- No gamma emitting radionuclides were detected above MDC in any of the groundwater samples collected during the June, July/August 2007 or the September/October 2007 monitoring events.
- Tritium concentrations in groundwater during the June, July and August and September/October 2007 monitoring events were below the Environmental Protection Agency's drinking water standard of 20,000 pCi/L.

Updated CSM

- Groundwater flow within the Till, Upper Dolomite and Lower Dolomite units at DBNPS is generally from west to east toward Lake Erie with groundwater discharge to the marshes and/or Lake Erie.
- Potential inadvertent releases from within the Power Block, including the Spent Fuel Pool, would migrate vertically down through the unsaturated zone to the water table. Potential releases from structures below ground could release tritium directly to the Upper or Lower Dolomite unit.

- Elevated detections in Upper Dolomite wells MW-31S and MW-32S are located on reported southwest to northeast fractures that project back to the Power Block.
- Tritium in groundwater will ultimately migrate into Lake Erie, where the concentrations will be diluted due to the volume of groundwater discharge versus the volume of water in the lake.
- Historic monitoring of Lake Erie by DBNPS indicates that there have been few detections of tritium above local background conditions, none of which are believed to be attributed to groundwater releases.

Based upon the above findings, FirstEnergy should further evaluate the hydrogeology and influence of plant features on site groundwater flow. In addition, tritium detections above local background conditions should be evaluated to establish a reliable monitoring well network for long-term monitoring.

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TABLES

Tables

Table 1
Monitoring Well Location and Construction Summary
FirstEnergy Nuclear Operating Company
Davis-Besse Power Station
5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

Well Designation	Date Installed	Well Condition for Monitoring	Hydrogeologic Position Relative to Power Blocks	MP Elevation (feet ASL)	Well Diameter (inches)	Screen Length (feet)	Constructed Well Depth (feet below ground)	Screen Interval Elevation (feet)		Geologic Unit Monitored	
								Top	Bottom		
New Wells											
MW-100A	9-Aug-2007	Functional	Up-gradient	586.83	2	10	28	569.33	559.33	Till	
MW-100B	9-Aug-2007	Functional	Up-gradient	586.74	2	10	45	552.24	542.24	Upper Dolomite	
MW-100C	9-Aug-2007	Functional	Up-gradient	586.27	2	10	85	511.77	501.77	Lower Dolomite	
MW-101A	15-Aug-2007	Functional	Down-gradient	586.96	2	10	28	569.46	559.46	Till	
MW-101B	15-Aug-2007	Functional	Down-gradient	586.89	2	10	45	552.39	542.39	Upper Dolomite	
MW-101C	15-Aug-2007	Functional	Down-gradient	587.18	2	10	80	517.68	507.68	Lower Dolomite	
MW-102A	16-Aug-2007	Functional	Down-gradient	585.12	2	10	29.5	566.12	556.12	Till	
MW-102B	16-Aug-2007	Functional	Down-gradient	585.04	2	10	44	551.54	541.54	Upper Dolomite	
MW-102C	16-Aug-2007	Functional	Down-gradient	585.31	2	10	78	517.81	507.81	Lower Dolomite	
MW-103A	21-Aug-2007	Functional	Down-gradient	589.24	2	10	35	555.74	555.24	Till	
MW-103B	21-Aug-2007	Functional	Down-gradient	589.19	2	10	48.5	551.19	541.19	Upper Dolomite	
MW-103C	21-Aug-2007	Functional	Down-gradient	588.87	2	10	78	521.37	511.37	Lower Dolomite	
MW-104A	24-Aug-2007	Functional	Down-gradient	585.25	2	10	32	563.75	553.75	Till	
MW-104B	24-Aug-2007	Functional	Down-gradient	584.98	2	10	46	550.48	539.48	Upper Dolomite	
MW-104C	24-Aug-2007	Functional	Down-gradient	584.84	2	10	77.5	517.84	507.84	Lower Dolomite	
MW-105A	28-Aug-2007	Functional	Down-gradient	585.46	2	10	27.5	568.46	558.46	Glaciolacustrine / Till	
Historic Wells											
MW-1S	Prior to March 1979	Functional	Down-gradient	584.02	3	20	41.7*	562.4	542.4	Upper Dolomite	
MW-1D	Prior to March 1979	Functional	Down-gradient	583.78	3	20	80.6*	523.2	503.2	Lower Dolomite	
MW-2S	Prior to March 1979	Functional	Down-gradient	584.46	3	20	40.5*	563.9	543.9	Upper Dolomite	
MW-2D	Prior to March 1979	Functional	Down-gradient	584.55	3	20	80.5*	524.0	504.0	Lower Dolomite	
MW-3S	Prior to March 1979	Functional	Down-gradient	584.81	3	20	41.7*	563.1	543.1	Upper Dolomite	
MW-3D	Prior to March 1979	Functional	Down-gradient	584.73	3	20	79.4*	525.3	505.3	Lower Dolomite	
MW-4S	Prior to March 1979	Functional	Down-gradient	588.59	3	20	46.3*	562.3	542.3	Upper Dolomite	
MW-4D	Prior to March 1979	Functional	Down-gradient	588.57	3	20	85.6*	523.0	503.0	Lower Dolomite	
MW-5S	Prior to March 1979	Functional	Down-gradient	584.88	3	20	42.3*	562.6	542.6	Upper Dolomite	
MW-5D	Prior to March 1979	Functional	Down-gradient	584.96	3	20	80.6*	524.3	504.3	Lower Dolomite	
MW-6S	Prior to March 1979	Functional	Down-gradient	578.86	3	20	34.4*	564.5	544.5	Upper Dolomite	
MW-6D	Prior to March 1979	Functional	Down-gradient	578.95	3	20	72.4*	526.6	506.6	Lower Dolomite	
MW-7S	Prior to March 1979	Functional	Cross-gradient	577.69	3	20	34.4*	563.3	543.3	Upper Dolomite	
MW-7D	Prior to March 1979	Functional	Cross-gradient	577.62	3	20	72.9*	524.7	504.7	Lower Dolomite	
MW-8S	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Upper Dolomite
MW-8D	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Lower Dolomite
MW-9S	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Upper Dolomite
MW-9D	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Lower Dolomite
MW-10S	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Upper Dolomite
MW-10D	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Lower Dolomite
MW-11S	Prior to March 1979	Functional	Down-gradient	586.31	3	20	42.6*	563.7	543.7	Upper Dolomite	
MW-11D	Prior to March 1979	Functional	Down-gradient	586.05	3	20	80.7*	525.3	505.3	Lower Dolomite	
MW-12S	Prior to March 1979	Functional	Down-gradient	585.96	3	20	42.0*	564.0	544.0	Upper Dolomite	
MW-12D	Prior to March 1979	Functional	Down-gradient	585.98	3	20	81.1*	524.9	504.9	Lower Dolomite	
MW-13S	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Upper Dolomite
MW-13D	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Lower Dolomite
MW-14S	Prior to March 1979	Functional	Down-gradient	586.24	3	20	42.2*	564.1	544.1	Upper Dolomite	
MW-14D	Prior to March 1979	Functional	Down-gradient	585.99	3	20	79.9*	526.1	506.1	Lower Dolomite	
MW-15S	Prior to March 1979	Functional	Down-gradient	585.84	3	20	42.6*	563.3	543.3	Upper Dolomite	
MW-15D	Prior to March 1979	Functional	Down-gradient	585.84	3	20	80.6*	525.3	505.3	Lower Dolomite	
MW-16S	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Upper Dolomite
MW-16D	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Lower Dolomite
MW-17S	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Upper Dolomite
MW-17D	Prior to March 1979		Well could not be located during the May 2007 well inventory. Well most likely destroyed								Lower Dolomite
MW-18S	Prior to March 1979	Functional	Cross-gradient	585.60	3	20	29.4*	576.2	556.2	Upper Dolomite	
MW-18D	Prior to March 1979	Functional	Cross-gradient	585.39	3	20	73.7*	531.7	511.7	Lower Dolomite	
MW-19S	Prior to March 1979	Functional	Up-gradient	585.77	3	20	41.8*	564.0	544.0	Upper Dolomite	
MW-19D	Prior to March 1979	Functional	Up-gradient	585.77	3	20	77.5*	528.3	508.3	Lower Dolomite	

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								Top	Bottom	
MW-20S	Prior to March 1979	Functional	Up-gradient	586.06	3	20	42.4*	563.6	543.6	Upper Dolomite
MW-20D	Prior to March 1979	Functional	Up-gradient	585.96	3	20	80.3*	525.7	505.7	Lower Dolomite
MW-21S	Prior to March 1979	Functional	Up-gradient	585.40	3	20	43.2*	562.2	542.2	Upper Dolomite
MW-21D	Prior to March 1979	Functional	Up-gradient	586.62	3	20	81.4*	525.3	505.3	Lower Dolomite
MW-22S	Prior to March 1979	Functional	Up-gradient	585.51	3	20	42.1*	563.5	543.5	Upper Dolomite
MW-22D	Prior to March 1979	Functional	Up-gradient	585.59	3	20	81.2*	524.4	504.4	Lower Dolomite
MW-23S	Prior to March 1979	Functional	Up-gradient	584.97	3	20	42.2*	562.8	542.8	Upper Dolomite
MW-23D	Prior to March 1979	Functional	Up-gradient	585.34	3	20	80.8*	524.6	504.6	Lower Dolomite
MW-24S	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Upper Dolomite
MW-24D	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Lower Dolomite
MW-25S	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Upper Dolomite
MW-25D	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Lower Dolomite
MW-26S	Prior to March 1979	Functional	Up-gradient	585.68	3	20	42.3*	563.3	543.3	Upper Dolomite
MW-26D	Prior to March 1979	Functional	Up-gradient	585.65	3	20	80.5*	525.2	505.2	Lower Dolomite
MW-27S	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Upper Dolomite
MW-27D	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Lower Dolomite
MW-28S	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Upper Dolomite
MW-28D	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Lower Dolomite
MW-29S	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Upper Dolomite
MW-29D	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Lower Dolomite
MW-30S	Prior to March 1979	Functional	Cross-gradient	587.20	3	20	40.9*	566.4	546.4	Upper Dolomite
MW-30D	Prior to March 1979	Functional	Cross-gradient	587.20	3	20	81.0*	526.2	506.2	Lower Dolomite
MW-31S	Prior to March 1979	missing cap	Down-gradient	586.11	3	20	42.9*	563.2	543.2	Upper Dolomite
MW-31D	Prior to March 1979	Functional	Down-gradient	586.39	3	20	81.2*	525.2	505.2	Lower Dolomite
MW-32S	Prior to March 1979	Functional	Down-gradient	586.05	3	20	42.6*	563.5	543.5	Upper Dolomite
MW-32D	Prior to March 1979	Functional	Down-gradient	586.17	3	20	81.0*	525.2	505.2	Lower Dolomite
MW-33S	Prior to March 1979	Functional	Down-gradient	585.85	3	20	42.2*	563.6	543.6	Upper Dolomite
MW-33D	Prior to March 1979	Functional	Down-gradient	585.89	3	20	80.7*	525.2	505.2	Lower Dolomite
MW-34S	Prior to March 1979	Functional	Down-gradient	586.01	3	20	42.8*	563.2	543.2	Upper Dolomite
MW-34D	Prior to March 1979	Functional	Down-gradient	585.87	3	20	80.7*	525.2	505.2	Lower Dolomite
MW-35S	Prior to March 1979	Functional	Cross-gradient	592.97	3	20	49.7*	563.3	543.3	Upper Dolomite
MW-35D	Prior to March 1979	Functional	Cross-gradient	592.84	3	20	86.3*	526.5	506.5	Lower Dolomite
MW-36S	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Upper Dolomite
MW-36D	Prior to March 1979			Well could not be located during the May 2007 well inventory. Well most likely destroyed						Lower Dolomite
MW-37S	Prior to March 1979	Functional	Cross-gradient	585.79	3	20	42.7*	563.1	543.1	Upper Dolomite
MW-37D	Prior to March 1979	Functional	Cross-gradient	585.77	3	20	80.6*	525.1	505.1	Lower Dolomite
MW-38S	Prior to March 1979	Functional	Cross-gradient	586.00	3	20	40.3*	565.7	545.7	Upper Dolomite
MW-38D	Prior to March 1979	Functional	Cross-gradient	586.16	3	20	79.0*	527.2	507.2	Lower Dolomite
MW-39S	Prior to March 1979	Functional	Up-gradient	585.38	3	20	40.3*	565.1	545.1	Upper Dolomite
MW-39D	Prior to March 1979	Functional	Up-gradient	585.53	3	20	81.2*	524.3	504.3	Lower Dolomite

Notes
All elevations are relative to mean sea level (ASL=above sea level)
MP = Measuring Point
* = No construction depth available. Value was measured on 9 and 10 May 2007
- = Data not available

Table 2a
Summary of Sampling Program - June 2007
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

Well Designation	Sampling	Groundwater Sampling Well Selection Rationale	Sampling Method
Historic Well			
MW-1S	X	Yes - Down-gradient from Power Block	Low-Flow
MW-1D	X	Yes - Down-gradient from Power Block	Low-Flow
MW-2S		No - Sample MW-1 Couplet	NA
MW-2D		No - Sample MW-1 Couplet	NA
MW-3S		No - Sample MW-1 Couplet	NA
MW-3D		No - Sample MW-1 Couplet	NA
MW-4S		No - Sample MW-12S	NA
MW-4D		No - Sample MW-12S	NA
MW-5S		No - Sample MW-12S	NA
MW-5D		No - Sample MW-12S	NA
MW-6S		No - Sample MW-12S	NA
MW-6D		No - Sample MW-12S	NA
MW-7S	X	Yes - Close to South Settling Pond	Low-Flow
MW-7D		No - Sample MW-7S	NA
MW-11S		No - Sample MW-12S	NA
MW-11D		No - Sample MW-12S	NA
MW-12S	X	Yes - Close to inadvertent release in 50.75(g)	Low-Flow
MW-12D		No - Sample MW-12S	NA
MW-14S		No - Sample MW-15 Couplet	NA
MW-14D		No - Sample MW-15 Couplet	NA
MW-15S	X	Yes - Down-gradient from Power Block	Low-Flow
MW-15D	X	Yes - Down-gradient from Power Block	Low-Flow
MW-18S	X	Yes - Previous tritium detection	Low-Flow
MW-18D	X	Yes - Previous tritium detection	Low-Flow
MW-19S		No - Sample MW-20 Couplet	NA
MW-19D		No - Sample MW-20 Couplet	NA
MW-20S	X	Yes - Previous tritium detection	Low-Flow
MW-20D	X	Yes - Previous tritium detection	Low-Flow
MW-21S		No - Sample MW-20 Couplet	NA
MW-21D		No - Sample MW-20 Couplet	NA
MW-22S		No - Sample MW-20 Couplet	NA
MW-22D		No - Sample MW-20 Couplet	NA
MW-23S		No - Sample MW-26 Couplet	NA
MW-23D		No - Sample MW-26 Couplet	NA
MW-26S	X	Yes - Upgradient of Power Block	Low-Flow
MW-26D	X	Yes - Upgradient of Power Block	Low-Flow
MW-30S	X	Yes - Cross-gradient of Power Block	Low-Flow
MW-30D		No - Sample MW-30S	NA
MW-31S		No - Sample MW-32 Couplet	NA
MW-31D		No - Sample MW-32 Couplet	NA
MW-32S	X	Yes - Down-gradient of Power Block	Low-Flow
MW-32D	X	Yes - Down-gradient of Power Block	Low-Flow
MW-33S	X	Yes - Down-gradient of Power Block	Low-Flow
MW-33D	X	Yes - Down-gradient of Power Block	Low-Flow
MW-34S		No - Sample MW-33 Couplet	NA
MW-34D		No - Sample MW-33 Couplet	NA
MW-35S		No - Sample MW-7S	NA
MW-35D		No - Sample MW-7S	NA
MW-37S		No - Sample MW-30S	NA
MW-37D		No - Sample MW-30S	NA
MW-38S		No - Sample MW-30S	NA
MW-38D		No - Sample MW-30S	NA
MW-39S		No - Sample MW-26 Couplet	NA
MW-39D		No - Sample MW-26 Couplet	NA

Note
 NA = Not Applicable

Table 2b
 Summary of Sampling Program - July/August 2007
 FirstEnergy Nuclear Operating Company
 Davis-Besse Nuclear Power Station
 5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

Well Designation	Sampling	Groundwater Sampling Well Selection Rationale	Sampling Method
Historic Well			
MW-12S	X	Confirm June 2007 sampling result	Low-Flow
MW-12D	X	Down-gradient from Power Block	Low-Flow
MW-30S	X	Confirm June 2007 sampling result	Low-Flow
MW-30D	X	Cross-gradient from Power Block	Low-Flow
MW-31S	X	Down-gradient from Power Block	Low-Flow
MW-31D	X	Down-gradient from Power Block	Low-Flow
MW-32S	X	Confirm June 2007 sampling result	Low-Flow
MW-32D	X	Confirm June 2007 sampling result	Low-Flow
MW-33S	X	Confirm June 2007 sampling result	Low-Flow
MW-33D	X	Confirm June 2007 sampling result	Low-Flow
MW-34S	X	Down-gradient from Power Block	Low-Flow
MW-34D	X	Down-gradient from Power Block	Low-Flow
MW-37S	X	Cross-gradient from Power Block	Low-Flow
MW-37D	X	Cross-gradient from Power Block	Low-Flow

Note
 NA = Not Applicable

Table 2c
 Summary of Sampling Program - September/October 2007
 FirstEnergy Nuclear Operating Company
 Davis-Besse Nuclear Power Station
 5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

Well Designation	Sampling	Groundwater Sampling Well Selection Rationale	Sampling Method
New Well			
MW-100A	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-100B	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-100C	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-101A	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-101B	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-101C	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-102A	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-102B	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-102C	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-103A	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-103B	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-103C	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-104A	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-104B	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-104C	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
MW-105A	X	Yes - New well for Groundwater Protection Initiative	Low-Flow
Historic Well			
MW-1S		No - Concentration below detection limit (June 2007)	NA
MW-1D		No - Concentration below detection limit (June 2007)	NA
MW-2S		No - Sample MW-101 Triplet	NA
MW-2D		No - Sample MW-101 Triplet	NA
MW-3S		No - Sample MW-101 Triplet	NA
MW-3D		No - Sample MW-101 Triplet	NA
MW-4S		No - Sample MW-12 Couplet	NA
MW-4D		No - Sample MW-12 Couplet	NA
MW-5S		No - Sample Couplet MW-35 and Triplet MW-101	NA
MW-5D		No - Sample Couplet MW-35 and Triplet MW-101	NA
MW-6S		No - Sample Couplet MW-35 and Triplet MW-101	NA
MW-6D		No - Sample Couplet MW-35 and Triplet MW-101	NA
MW-7S		No - Sample MW-35 Couplet	NA
MW-7D		No - Sample MW-35 Couplet	NA
MW-11S		No - Sample MW-12 Couplet	NA
MW-11D		No - Sample MW-12 Couplet	NA
MW-12S	X	Yes - Previous tritium detection (860 pCi/L in July 2007)	Low-Flow
MW-12D	X	Yes - Previous tritium detection (1,155 pCi/L in July 2007)	Low-Flow
MW-14S		No - Sample MW-15 Couplet	NA
MW-14D		No - Sample MW-15 Couplet	NA
MW-15S	X	Yes - Up-gradient of tritium detections at MW-12 and MW-34	Low-Flow
MW-15D	X	Yes - Up-gradient of tritium detections at MW-12 and MW-34	Low-Flow
MW-18S		No - Sample MW-15 Couplet	NA
MW-18D		No - Sample MW-15 Couplet	NA
MW-19S		No - Sample MW-20 Couplet	NA
MW-19D		No - Sample MW-20 Couplet	NA
MW-20S	X	Yes - Up-gradient of tritium detections at MW-12, MW-33 and MW-34	Low-Flow
MW-20D	X	Yes - Up-gradient of tritium detections at MW-12, MW-33 and MW-34	Low-Flow
MW-21S		No - Sample MW-20 Couplet	NA
MW-21D		No - Sample MW-20 Couplet	NA
MW-22S		No - Sample MW-20S and MW-23S	NA
MW-22D		No - Sample MW-20 and MW-23 Couplets	NA
MW-23S	X	Yes - Up-gradient of tritium detection at MW-37S	Low-Flow
MW-23D		No - Sample MW-20 Couplet	NA

Table 2c
 Summary of Sampling Program - September/October 2007
 FirstEnergy Nuclear Operating Company
 Davis-Besse Nuclear Power Station
 5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

Well Designation	Sampling	Groundwater Sampling Well Selection Rationale	Sampling Method
MW-26S		No - Sample MW-20 Couplet	NA
MW-26D		No - Sample MW-20 Couplet	NA
MW-30S	X	Yes - Previous tritium detection (1,149 pCi/L in July 2007)	Low-Flow
MW-30D	X	Yes - Previous tritium detection at MW-30S (1,149 pCi/L in August 2007)	Low-Flow
MW-31S	X	Yes - Previous tritium detection (7,322 pCi/L in July 2007)	Low-Flow
MW-31D	X	Yes - Cross-gradient of tritium detections at MW-32	Low-Flow
MW-32S		No - Sample MW-31 Couplet	NA
MW-32D		No - Sample MW-31 Couplet	NA
MW-33S	X	Yes - Previous tritium detection (2,702 pCi/L in July 07)	Low-Flow
MW-33D	X	Yes - Previous tritium detection (3,271 pCi/L in July 07)	Low-Flow
MW-34S		No - Sample MW-33 & MW-12 Couplets	NA
MW-34D		No - Sample MW-33 & MW-12 Couplets	NA
MW-35S	X ^u	Yes - Cross-gradient of tritium detections at MW-12	Low-Flow
MW-35D	X	Yes - Cross-gradient of tritium detections at MW-12	Low-Flow
MW-37S	X	Yes - Previous tritium detection (2,961 pCi/L in July 2007)	Low-Flow
MW-37D		No - Relatively low tritium detection (135 pCi/L in July 2007)	NA
MW-38S		No - Sample MW-37S	NA
MW-38D		No - Relatively low tritium detection at MW-37D	NA
MW-39S		No - Sample MW-20 Couplet	NA
MW-39D		No - Sample MW-20 Couplet	NA

Note
 NA = Not Applicable

Table 3
Summary of Analytical Program - June, July/August, & September/October 2007
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

June 2007 Sampling Event

Well Designation	Tritium (EPA Method 906.0)					Gamma (EPA Method 901.1)				
	N	MS/MSD	FD	LD	EB	N	MS/MSD	FD	LD	EB
MW-1S	X					X				
MW-1D	X					X				
MW-7S	X					X				
MW-12S	X		X			X		X		
MW-15S	X					X				
MW-15D	X					X				
MW-18S	X					X				
MW-18D	X					X				
MW-20S	X		X			X		X		
MW-20D	X					X				
MW-26S	X					X				
MW-26D	X	X				X	X			
MW-30S	X					X				
MW-32S	X					X				
MW-32D	X					X				
MW-33S	X					X				
MW-33D	X					X				

July/August 2007 Sampling Event

Well Designation	Tritium (EPA Method 906.0)					Gamma (EPA Method 901.1)				
	N	MS/MSD	FD	LD	EB	N	MS/MSD	FD	LD	EB
MW-12S	X									
MW-12D	X									
MW-30S	X									
MW-30D	X									
MW-31S	X									
MW-31D	X									
MW-32S	X		X							
MW-32D	X									
MW-33S	X									
MW-33D	X									
MW-34S	X									
MW-34D	X									
MW-37S	X									
MW-37D	X									

September/October 2007 Sampling Event

Well Designation	Tritium (EPA Method 906.0)					Gamma (EPA Method 901.1)				
	N	MS/MSD	FD	LD	EB	N	MS/MSD	FD	LD	EB
MW-12S	X					X				
MW-12D	X		X			X		X		
MW-15S	X					X				
MW-15D	X					X				
MW-20S	X		X			X		X		
MW-20D	X					X				
MW-23S	X					X				
MW-30S	X	X				X	X			
MW-30D	X					X				
MW-31S	X		X			X		X		
MW-31D	X					X				
MW-33S	X			X		X			X	
MW-33D	X					X				
MW-35S	X					X				
MW-35D	X					X				
MW-37S	X					X				
MW-100A	X	X				X	X			
MW-100B	X					X				
MW-100C	X					X				
MW-101A	X					X				
MW-101B	X					X				
MW-101C	X					X				
MW-102A	X			X		X			X	
MW-102B	X					X				
MW-102C	X					X				
MW-103A	X					X				
MW-103B	X		X			X		X		
MW-103C	X				X	X				X
MW-104A	X					X				
MW-104B	X					X				
MW-104C	X					X				
MW-105A	X					X				

Notes
X = Well sampled and/or gauged.
MS/MSD = Matrix Spike/Matrix Spike Duplicate
N = Normal Sample
FD = Field Duplicate
LD = Laboratory Duplicate
EB = Equipment Blank

Table 4
Summary of Groundwater Gauging Data
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

Well Designation	Measuring Point	Measuring Point Elevation (feet ASL)	Geologic Unit Monitored	Depth to Water (feet below MP)			Groundwater Elevation (feet ASL)		
				11 June 2007	31 July 2007	24 September 2007	11 June 2007	31 July 2007	24 September 2007
New Wells									
MW-100A	Top of PVC	586.83	Till	NA	NA	12.92	NA	NA	573.91
MW-100B	Top of PVC	586.74	Upper Dolomite	NA	NA	12.78	NA	NA	573.96
MW-100C	Top of PVC	586.27	Lower Dolomite	NA	NA	12.71	NA	NA	573.56
MW-101A	Top of PVC	586.97	Till	NA	NA	15.15	NA	NA	571.82
MW-101B	Top of PVC	586.89	Upper Dolomite	NA	NA	14.01	NA	NA	572.88
MW-101C	Top of PVC	587.18	Lower Dolomite	NA	NA	22.73	NA	NA	564.45
MW-102A	Top of PVC	585.09	Till	NA	NA	12.10	NA	NA	572.99
MW-102B	Top of PVC	585.03	Upper Dolomite	NA	NA	11.80	NA	NA	573.23
MW-102C	Top of PVC	585.31	Lower Dolomite	NA	NA	27.08	NA	NA	558.23
MW-103A	Top of PVC	589.18	Till	NA	NA	17.01	NA	NA	572.17
MW-103B	Top of PVC	589.20	Upper Dolomite	NA	NA	16.27	NA	NA	572.93
MW-103C	Top of PVC	588.90	Lower Dolomite	NA	NA	71.28	NA	NA	517.62
MW-104A	Top of PVC	585.25	Till	NA	NA	12.73	NA	NA	572.52
MW-104B	Top of PVC	584.98	Upper Dolomite	NA	NA	11.91	NA	NA	573.07
MW-104C	Top of PVC	584.84	Lower Dolomite	NA	NA	31.61	NA	NA	553.23
MW-105A	Top of PVC	585.46	Glaciolacustrine & Till	NA	NA	16.73*	NA	NA	568.73
Historic Wells									
MW-1S	Top of PVC	584.02	Upper Dolomite	13.50	NM	NM	570.52	NM	NM
MW-1D	Top of PVC	583.78	Lower Dolomite	11.95	NM	NM	571.83	NM	NM
MW-2S	Top of PVC	584.46	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-2D	Top of PVC	584.55	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-3S	Top of PVC	584.81	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-3D	Top of PVC	584.73	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-4S	Top of PVC	588.59	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-4D	Top of PVC	588.57	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-5S	Top of PVC	584.88	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-5D	Top of PVC	584.96	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-6S	Top of PVC	578.86	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-6D	Top of PVC	578.95	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-7S	Top of PVC	577.69	Upper Dolomite	5.72	NM	NM	571.97	NM	NM
MW-7D	Top of PVC	577.62	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-11S	Top of PVC	586.31	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-11D	Top of PVC	586.05	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-12S	Top of PVC	585.96	Upper Dolomite	14.11	14.51	14.98	571.85	571.45	570.98
MW-12D	Top of PVC	585.98	Lower Dolomite	NM	14.39	14.73	NM	571.59	571.25
MW-14S	Top of PVC	586.24	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-14D	Top of PVC	587.94	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-15S	Top of PVC	585.84	Upper Dolomite	13.04	NM	14.18	572.80	NM	571.66
MW-15D	Top of PVC	585.84	Lower Dolomite	13.42	NM	14.27	572.42	NM	571.57
MW-18S	Top of PVC	587.56	Upper Dolomite	12.77	NM	NM	574.79	NM	NM
MW-18D	Top of PVC	587.34	Lower Dolomite	12.89	NM	NM	574.45	NM	NM
MW-19S	Top of PVC	587.39	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-19D	Top of PVC	587.39	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-20S	Top of PVC	586.06	Upper Dolomite	13.02	NM	14.28	573.04	NM	571.78
MW-20D	Top of PVC	585.96	Lower Dolomite	13.41	NM	14.25	572.55	NM	571.71
MW-21S	Top of PVC	588.33	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-21D	Top of PVC	588.58	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-22S	Top of PVC	585.51	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-22D	Top of PVC	585.59	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-23S	Top of PVC	584.97	Upper Dolomite	NM	NM	13.35	NM	NM	571.62
MW-23D	Top of PVC	585.34	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-26S	Top of PVC	585.68	Upper Dolomite	12.83	NM	NM	572.85	NM	NM
MW-26D	Top of PVC	585.65	Lower Dolomite	13.68	NM	NM	571.97	NM	NM
MW-30S	Top of PVC	588.20	Upper Dolomite	13.88	14.32	14.92	574.32	573.88	573.28
MW-30D	Top of PVC	588.17	Lower Dolomite	13.90	14.27	14.86	574.27	573.90	573.31
MW-31S	Top of PVC	586.11	Upper Dolomite	NM	14.42	15.03	571.69	NM	571.08
MW-31D	Top of PVC	586.39	Lower Dolomite	NM	15.01	15.48	NM	571.38	570.91
MW-32S	Top of PVC	586.05	Upper Dolomite	13.80	14.21	NM	572.25	571.84	NM
MW-32D	Top of PVC	586.17	Lower Dolomite	13.42	14.40	NM	572.75	571.77	NM
MW-33S	Top of PVC	585.85	Upper Dolomite	13.17	14.54	14.29	572.68	571.31	571.56
MW-33D	Top of PVC	585.89	Lower Dolomite	13.54	13.99	14.43	572.35	571.90	571.46
MW-34S	Top of PVC	586.01	Upper Dolomite	NM	14.18	NM	571.83	NM	NM
MW-34D	Top of PVC	585.87	Lower Dolomite	NM	14.05	NM	571.82	NM	NM
MW-35S	Top of PVC	592.97	Upper Dolomite	NM	NM	21.16	NM	NM	571.81
MW-35D	Top of PVC	592.84	Lower Dolomite	NM	NM	20.69	NM	NM	572.15
MW-37S	Top of PVC	585.79	Upper Dolomite	NM	13.23	14.08	572.56	NM	571.71
MW-37D	Top of PVC	585.77	Lower Dolomite	NM	15.80	16.43	569.97	NM	569.34
MW-38S	Top of PVC	585.40	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-38D	Top of PVC	585.52	Lower Dolomite	NM	NM	NM	NM	NM	NM
MW-39S	Top of PVC	586.23	Upper Dolomite	NM	NM	NM	NM	NM	NM
MW-39D	Top of PVC	587.56	Lower Dolomite	NM	NM	NM	NM	NM	NM

Notes
All elevations are relative to mean sea level (ASL=above sea level)
NA = Not Applicable
NM = Not Measured
MP = Measuring Point
*: Reading might be biased. Pressure relieved upon opening well

Table 5
Summary of Groundwater Field Parameters
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

New Monitoring Wells

Parameter	Well ID	MW-100A	MW-100B	MW-100C	MW-101A	MW-101B	MW-101C	MW-102A	MW-102B	MW-102C	MW-103A	MW-103B	MW-103C**	MW-104A	MW-104B	MW-104C	MW-105A
	Sampling Date	24-Sep-07	25-Sep-07	25-Sep-07	02-Oct-07	02-Oct-07	02-Oct-07	25-Sep-07	27-Sep-07	27-Sep-07	01-Oct-07	01-Oct-07	01-Oct-07	28-Sep-07	28-Sep-07	28-Sep-07	8-Oct-07
Temperature (°C)		16.5	17.4	17.0	14.1	14.6	15.4	18.1	15.5	16.1	15.1	14.1	14.5	14.1	14.2	16.2	19.8
Specific Conductivity (uS/cm)		2,958	2,746	8,883	1,980	2,091	161,500	2,635	2,482	140,700	2,421	2,458	121,000	2,506	2,477	21,210	2,381
Dissolved Oxygen (mg/l)		4.24	13.13*	1.58	2.07	3.08	<2.00	25.07*	3.47	<2.00	1.92	2.88	0.92	15.01*	9.71*	6.12*	1.74
pH (-)		7.1	7.1	7.3	6.8	7.3	6.0	6.9	7.2	6.8	7.1	7.2	6.8	6.9	7.1	7.3	6.9
Oxidation Reduction Potential (mV)		-127	-213	-322	-4	15	-315	-191	-213	-368	-196	-252	-259	-120	-288	-70	-108
Turbidity (NTU)		0.47	1.29	1.01	0.39	2.94	798	NM	1.3	10.4	1.8	1.2	9.6	2.2	2.4	38.4	3.8

Historic Monitoring Wells

Parameter	Well ID	MW-1S	MW-1D	MW-7S	MW-12S		MW-12D		MW-15S		MW-15D		MW-18S	MW-18D	MW-20S		
	Sampling Date	12-Jun-07	12-Jun-07	13-Jun-07	14-Jun-07	06-Aug-07	4-Oct-07	06-Aug-07	04-Oct-07	26-Jun-07	10-Oct-07	26-Jun-07	10-Oct-07	14-Jun-07	14-Jun-07	25-Jun-07	09-Oct-07
Temperature (°C)		14.0	16.1	16.5	17.5	20.2	17.9	20.8	18.8	21.7	21.0	21.2	20.3	16.2	18.4	14.8	18.9
Specific Conductivity (uS/cm)		2,696	62,257	1,982	2,187	2,185	2,101	3,762	3,633	2,434	2,327	5,168	4,790	1,260	6,997	1,901	2,233
Dissolved Oxygen (mg/l)		2.10	0.33	0.34	0.34	5.52*	3.60*	0.23	6.30*	0.41	1.68	0.46	13.68*	8.42*	0.27	0.78	1.71
pH (-)		7.0	7.0	7.2	7.2	7.3	7.3	7.2	7.1	7.3	7.2	7.2	7.0	8.8	7.7	7.3	7.2
Oxidation Reduction Potential (mV)		-116	-67	4	19	-44	87.2	-307	-293	-161	42	-320	-321	53	-155	83	-31
Turbidity (NTU)		0.9	1.0	0.5	0.9	0.2	0.5	1.6	2	0	0.3	4	0	4.2	1.8	0.2	0.1

Parameter	Well ID	MW-20D		MW-23S	MW-26S	MW-26D	MW-30S		MW-30D		MW-31S		MW-31D		MW-32S		
	Sampling Date	25-Jun-07	10-Oct-07	10-Oct-07	13-Jun-07	13-Jun-07	27-Jun-07	02-Aug-07	8-Oct-07	03-Aug-07	09-Oct-07	31-Jul-07	5-Oct-07	31-Jul-07	8-Oct-07	25-Jun-07	31-Jul-07
Temperature (°C)		18.0	16.0	13.6	15.8	17.2	17.8	17.2	17.6	17.7	16.7	23.5	24.5	23.4	22.3	22.7	21.6
Specific Conductivity (uS/cm)		2,150	2,309	2,402	2,216	43,394	2,224	2,529	2,365	34,778	38,860	2,484	2,288	22,410	20,110	2,362	2,492
Dissolved Oxygen (mg/l)		0.24	1.26	1.51	0.43	0.04	0.71	NM	1.32	NM	<2.00	0.66	4.52*	0.55	2.40	0.21	7.75*
pH (-)		7.3	7.2	7.1	7.2	7.6	7.0	7.3	7.1	6.9	6.7	7.2	7.1	7.1	7.0	7.4	7.2
Oxidation Reduction Potential (mV)		-28	-56	7	37	-303	-66	-105	-25	-366	-356	-116	-148	-287	-316	-84	-92
Turbidity (NTU)		3.0	0.3	0.81	1.1	0.9	0.4	0.3	0	0.4	0.3	1.8	4.1	0.4	0.4	2.6	0.8

Parameter	Well ID	MW-32D		MW-33S			MW-33D			MW-34S	MW-34D	MW-35S	MW-35D	MW-37S		MW-37D
	Sampling Date	26-Jun-07	1-Aug-07	27-Jun-07	1-Aug-07	5-Oct-07	27-Jun-07	2-Aug-07	5-Oct-07	2-Aug-07	02-Aug-07	03-Aug-07	03-Oct-07	3-Aug-07	9-Oct-07	6-Aug-07
Temperature (°C)		20.6	21.5	25.3	25.5	25.5	24.9	25.2	25.2	25.6	24.2	19.1	18.4	17.7	15.2	19.8
Specific Conductivity (uS/cm)		15,235	15,050	2,615	2,554	2,325	7,471	6,337	6,600	2,589	11,031	2,776	6,564	2,477	2,235	113
Dissolved Oxygen (mg/l)		0.29	NM	1.00	NM	7.07*	0.42	NM	4.93*	NM	NM	3.24	1.70	NM	NM	0.08
pH (-)		6.9	6.8	7.2	7.2	7.1	7.0	6.6	6.9	7.2	7.0	7.2	7.2	7.4	7.3	6.7
Oxidation Reduction Potential (mV)		-338	-351	-1	-96	37	-322	-298	-340	-125	-317	-50	-286	-134	-188	-256
Turbidity (NTU)		0.3	0.4	1.8	0.7	0.59	0.3	0.4	0.25	0.4	0.4	0.6	1	5.6	0.4	3.3

Notes
°C = degrees Celcius
uS/cm = microsiemens per centimeter
mg/l = milligrams per liter
mV = millivolts
NTU = nephelometric units

NM = Parameter not measured (probe defect)
* = Value rejected (D.O increased with depth, value outside of calibration range, and/or inconsistent with nearby or historical results)
** = Well went dry - Field parameters not stabilized
< 1 = Dissolved Oxygen value interpolated. Presence of sulfide is an indicator of anaerobic conditions

Table 6
 Summary of Groundwater Analytical Results
 FirstEnergy Nuclear Operating Company
 Davis-Besse Nuclear Power Station
 5501 N. State Route 2 MS3085, Oak Harbor, OH 43449

New Monitoring Wells

Sample Location	MW-100A	MW-100B	MW-100C	MW-101A	MW-101B	MW-101C	MW-102A		MW-102B	MW-102C	MW-103A	MW-103B		MW-103C	MW-104A	MW-104B	MW-104C	MW-105A
Date Sampled	24-Sep-07	25-Sep-07	25-Sep-07	2-Oct-07	2-Oct-07	2-Oct-07	25-Sep-07	25-Sep-07	27-Sep-07	27-Sep-07	1-Oct-07	1-Oct-07	1-Oct-07	1-Oct-07	28-Sep-07	28-Sep-07	28-Sep-07	8-Oct-07
Sample Type	N	N	N	N	N	N	N	LD	N	N	N	N	FD (DBD-04)	N	N	N	N	N
Tritium	<193	<193	<149	237	207	<193	344	387	394	<193	495	362	394	<149	237	250	<193	1832
Gamma	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Historic Monitoring Wells

Sample Location	MW-1S	MW-1D	MW-7S	MW-12S			MW-12D				MW-15S		MW-15D		MW-18S	MW-18D
Date Sampled	12-Jun-07	12-Jun-07	13-Jun-07	14-Jun-07	14-Jun-07	6-Aug-07	4-Oct-07	6-Aug-07	4-Oct-07	4-Oct-07	26-Jun-07	10-Oct-07	26-Jun-07	10-Oct-07	14-Jun-07	14-Jun-07
Sample Type	N	N	N	N	FD (DBD-01)	N	N	N	N	FD (DBD-01)	N	N	N	N	N	N
Tritium	<330	<330	426	657	764	860	276	1,155	738	769	375	301	704	442	277	204
Gamma	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND

Sample Location	MW-20S				MW-20D		MW-23S	MW-26S	MW-26D	MW-30S			MW-30D		MW-31S	
Date Sampled	25-Jun-07	25-Jun-07	9-Oct-07	9-Oct-07	25-Jun-07	10-Oct-07	10-Oct-07	13-Jun-07	13-Jun-07	27-Jun-07	2-Aug-07	8-Oct-07	3-Aug-07	9-Oct-07	31-Jul-07	5-Oct-07
Sample Type	N	FD (DBD-02)	N	FD (DBD-02)	N	N	N	N	N	N	N	N	N	N	N	N
Tritium	255	279	189	218	328	<174	306	341	<330	1,307	1,149	494	231	<174	7,322	3,149
Gamma	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND

Sample Location	MW-31S	MW-31D		MW-32S			MW-32D		MW-33S				MW-33D		MW-34S	
Date Sampled	5-Oct-07	31-Jul-07	8-Oct-07	25-Jun-07	31-Jul-07	31-Jul-07	26-Jun-07	1-Aug-07	27-Jun-07	1-Aug-07	5-Oct-07	5-Oct-07	27-Jun-07	2-Aug-07	5-Oct-07	2-Aug-07
Sample Type	FD (DBD-03)	N	N	N	N	FD (DBD-01)	N	N	N	N	N	LD	N	N	N	N
Tritium	3,012	108	183	5,838	7,535	7,185	466	507	2,287	2,702	1,110	1,230	2,975	3,271	1,934	2,839
Gamma	ND	NA	ND	ND	NA	NA	ND	NA	ND	NA	ND	ND	ND	NA	ND	NA

Sample Location	MW-34D	MW-35S	MW-35D	MW-37S		MW-37D
Date Sampled	2-Aug-07	3-Oct-07	3-Oct-07	3-Aug-07	9-Oct-07	6-Aug-07
Sample Type	N	N	N	N	N	N
Tritium	1,076	227	368	2,961	1,231	135
Gamma	NA	ND	ND	NA	ND	NA

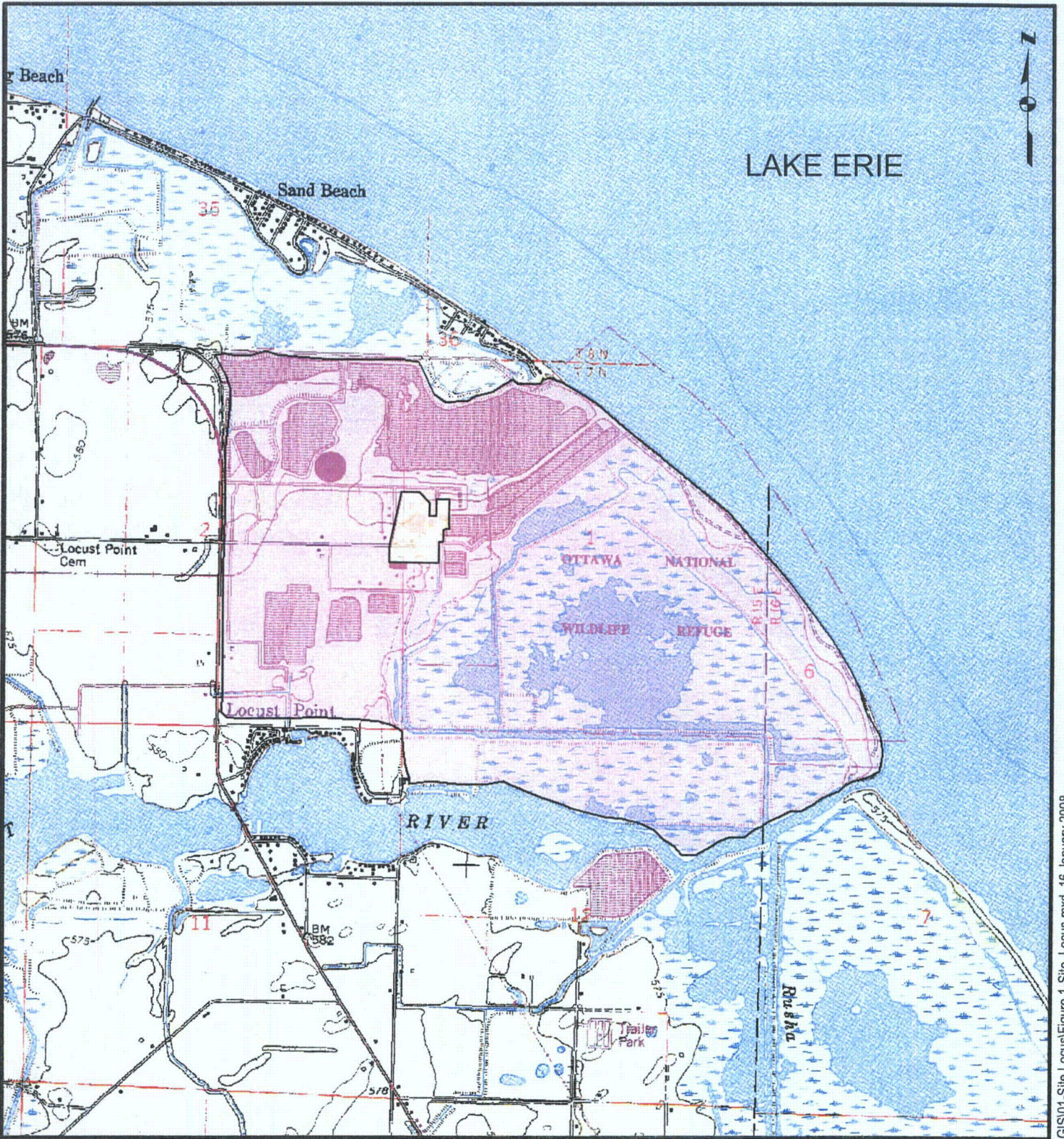
Notes

Units are pCi/L (picoCuries per liter)
 Bold cells indicate concentrations greater than the laboratory detection limits
 < = Analytical result below the method detection limit
 ND = No detections above laboratory lower limit of detection
 NA = Not analyzed
 N = Normal Sample
 FD (DBD01) = Field Duplicate (Designation of duplicate sample in laboratory report)
 LD = Laboratory Duplicate (Designation of duplicated sample in laboratory report)

Tritium analysis by EPA Method 906.0
 Gamma emitting radionuclides analysis by EPA Method 901.1
 Analysis performed by Midwest Laboratory
 Gamma emitting radionuclides analysis includes:
 Mn-54, Fe-59, Co-60, Zn-65, Zr-Nb-95, Cs-134, Cs-137, Ba-La-140

Figures

FIGURES



LAKE ERIE

Sand Beach

OTTAWA NATIONAL
WILDLIFE REFUGE

RIVER

Locust Point
Cem

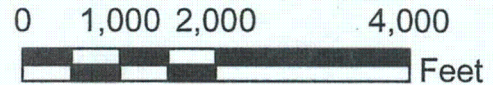
Locust Point

Trailer
Park

Legend

- Protected Area
- Site Boundary

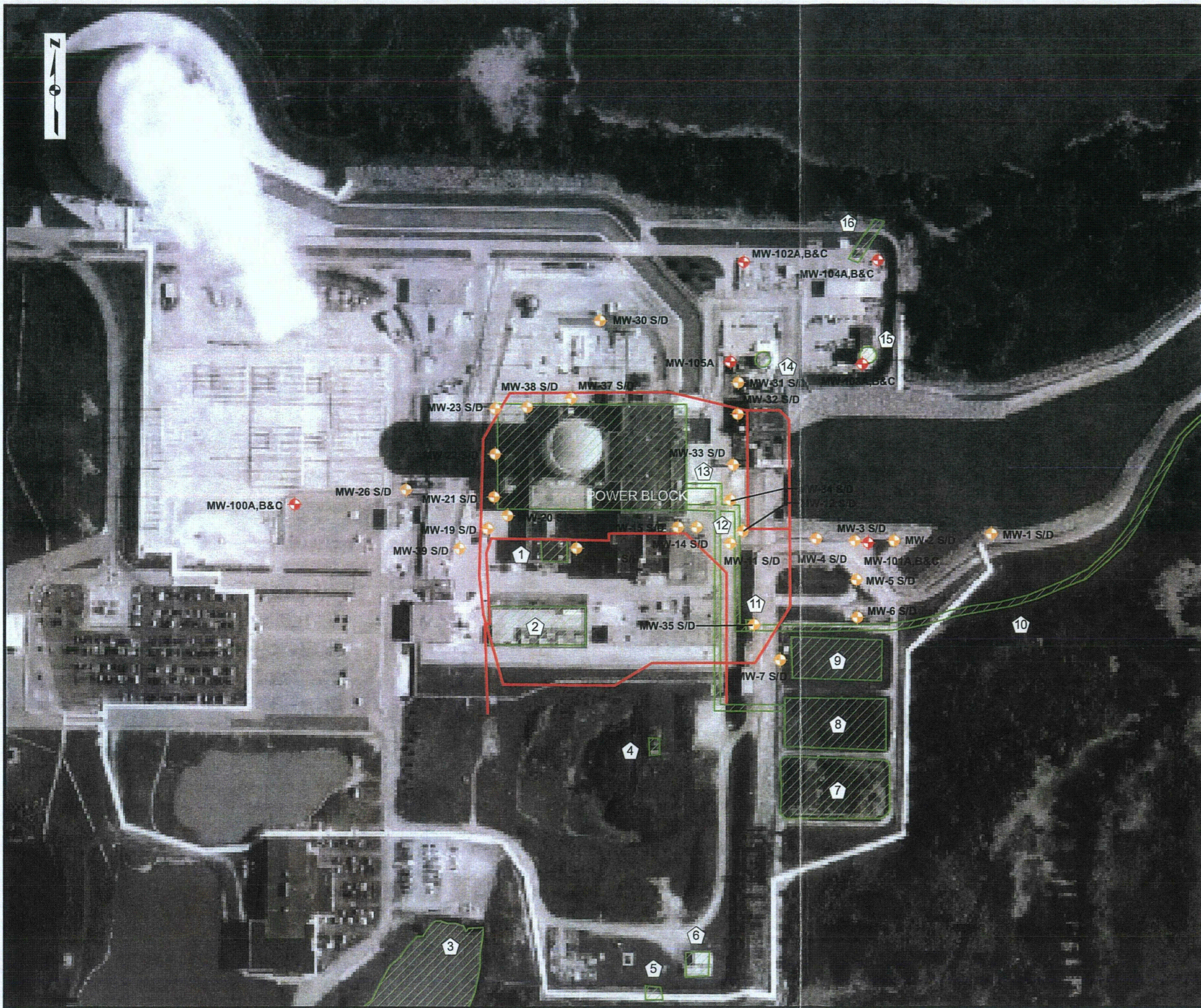
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Source: USGS Topographic Quadrangles
(o41083e2, o41083e1)

Figure 1 - Site Locus Map
Davis-Besse Nuclear Power Station
Oak Harbor, OH





Legend

- Limits of Grout Curtain
- + Monitoring Well Installed in August 2007
- + Historic Monitoring Well
- A: Till Well
- B/S: Upper Dolomite Well
- C/D: Lower Dolomite Well
- Radiological Area of Potential Concern

Radiological Areas of Concern:

- ① Low Level Rad Waste Storage Building
- ② Dry Fuel Storage Area
- ③ Training Center Pond NPDES Outfall 002
- ④ Sewage Treatment Plant (Abandoned)
- ⑤ NPDES Outfall 001
- ⑥ Sewage Treatment Plant (Current)
- ⑦ Sanitary Lagoon
- ⑧ South Setting Basin
- ⑨ North Setting Basin
- ⑩ Collection Box Discharge Pipe
- ⑪ Collection Box
- ⑫ Liquid Radwaste Discharge Line
- ⑬ Condensate Demineralized Water Storage Tank
- ⑭ Secondary Demineralized Water Storage Tank
- ⑮ Fire Water Storage Tank
- ⑯ Service Building 4 Outfall

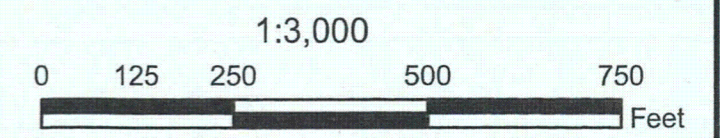
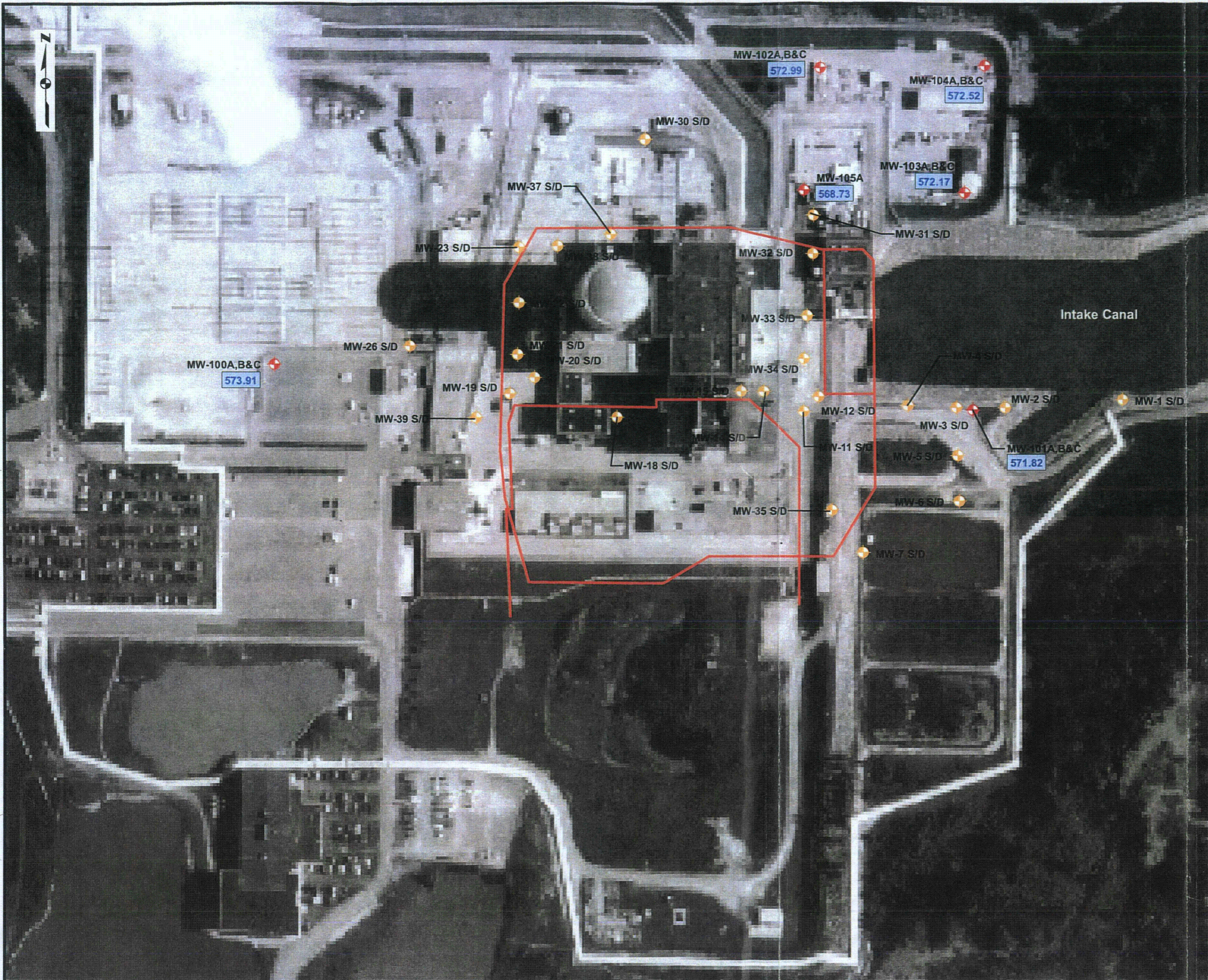


Figure 2 - Site Layout
 Davis-Besse Nuclear Power Station
 Oak Harbor, OH



R:\FirstEnergy\DavisBesse\WorkingFigures-GIS\2-Site Layout\Figure 2-Site Layout.mxd, 25 February 2008 Kenen Pm-Tan



Legend

- Limits of Grout Curtain
- ⊕ Monitoring Well Installed in August 2007
- Historic Monitoring Well
- A: Till Well
- B/S: Upper Dolomite Well
- C/D: Lower Dolomite Well
- 572.30 Groundwater Elevations 24 September 2007
- ➔ Approximate Groundwater Flow Direction in Upper Dolomite Unit

Note:
 Lake Erie surface water elevation on 24 September 2007 fluctuated between 570.87 and 571.17 (NOAA Marblehead Gauging Station, OH).

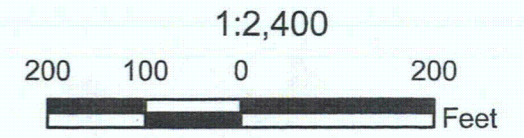
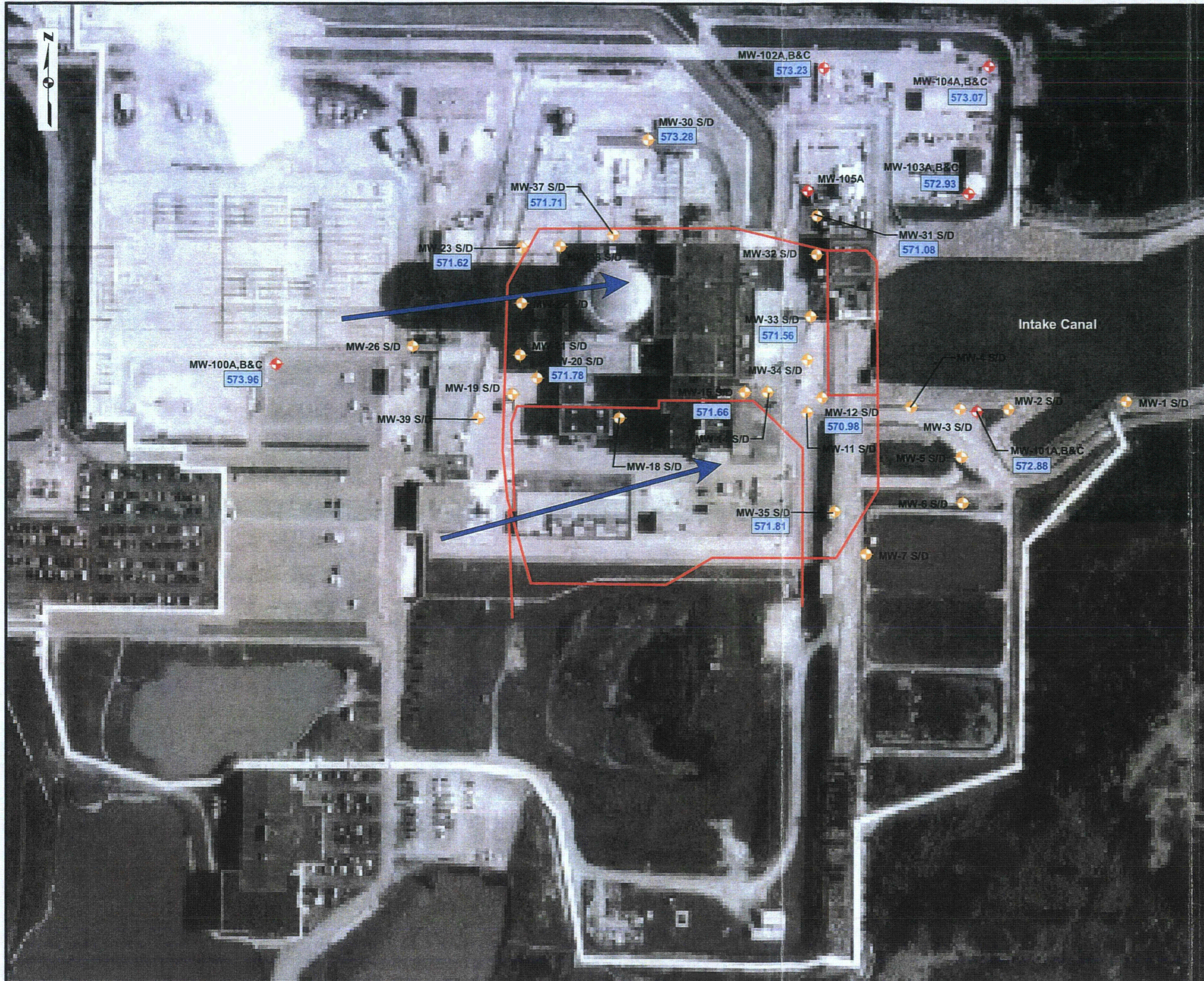


Figure 3 - Groundwater Elevations Till Unit - September/October 2007
 Davis-Besse Nuclear Power Station, Oak Harbor, OH



09/26/07
 09/26/07



Legend

- Limits of Grout Curtain
- ⊕ Monitoring Well Installed in August 2007
- ⊕ Historic Monitoring Well
- A: Till Well
- B/S: Upper Dolomite Well
- C/D: Lower Dolomite Well
- 572.30 Groundwater Elevations
24 September 2007 - Monitoring Wells B/S
- ➔ Approximate Groundwater Flow Direction
in Upper Dolomite Unit

Note:

Lake Erie surface water elevation on 24 September 2007 fluctuated between 570.87 and 571.17 (NOAA Marblehead Gauging Station, OH).

September 2007

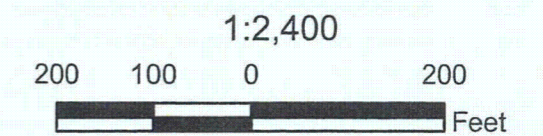
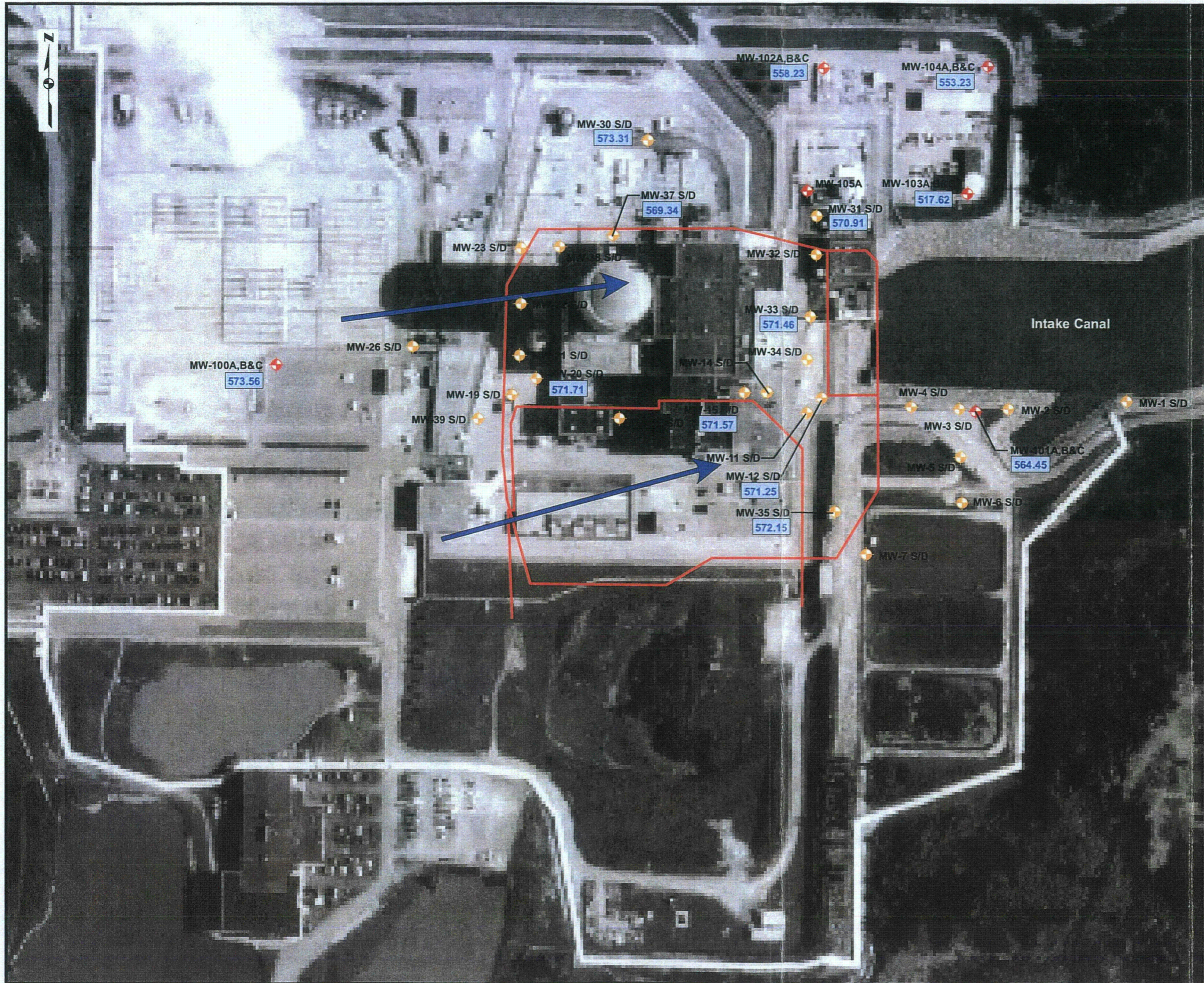


Figure 4 - Groundwater Elevations
Upper Dolomite - September/October 2007
Davis-Besse Nuclear Power Station,
Oak Harbor, OH





Legend

- Limits of Grout Curtain
- ◆ Monitoring Well Installed in August 2007
- ◆ Historic Monitoring Well
- A: Till Well
- B/S: Upper Dolomite Well
- C/D: Lower Dolomite Well
- 572.30 Groundwater Elevations
24 September 2007 - Monitoring Wells C/D
- ➡ Approximate Groundwater Flow Direction
in the Lower Dolomite Unit

Note:

Lake Erie surface water elevation on 24 September 2007 fluctuated between 570.87 and 571.17 (NOAA Marblehead Gauging Station, OH).

compton

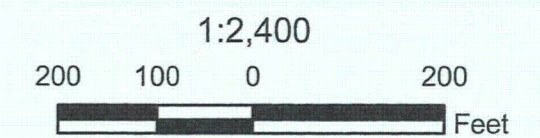
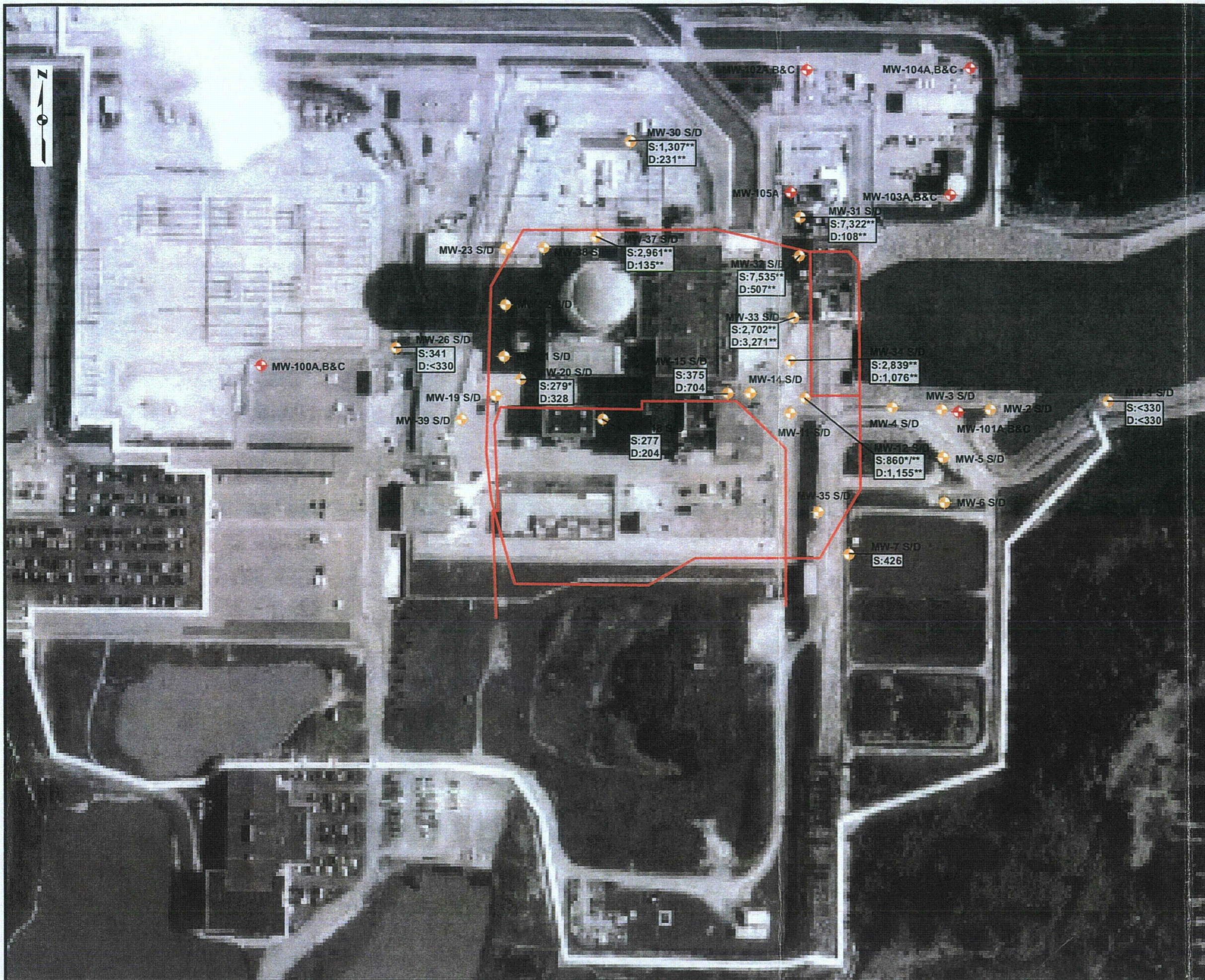


Figure 5 - Groundwater Elevations
Lower Dolomite - September/October 2007
Davis-Besse Nuclear Power Station,
Oak Harbor, OH





Legend

- Limits of Grout Curtain
- ◆ Monitoring Well Installed in August 2007
- ◆ Historic Monitoring Well
- A: Till Well
- B/S: Upper Dolomite Well
- C/D: Lower Dolomite Well

Results:

- 466 Tritium Activity in pCi/L
- <169 Tritium Activity Below Laboratory Lower Limit of Detection (value indicated)
- pCi/L picoCuries per Liter
- * Field Duplicate taken. Highest result shown
- ** Confirmatory sample taken at the location in July/August.

Analysis performed by Midwest Laboratory using EPA Method 906.0

Notes:

Groundwater monitoring samples were taken between 12 and 27 June 2007 during the June sampling event.

Groundwater monitoring samples were taken between 31 July and 6 August 2007 during the July/August sampling event (confirmatory sampling event).

Highest results of the two sampling events are shown.

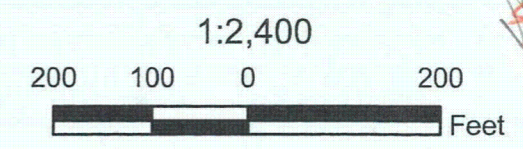
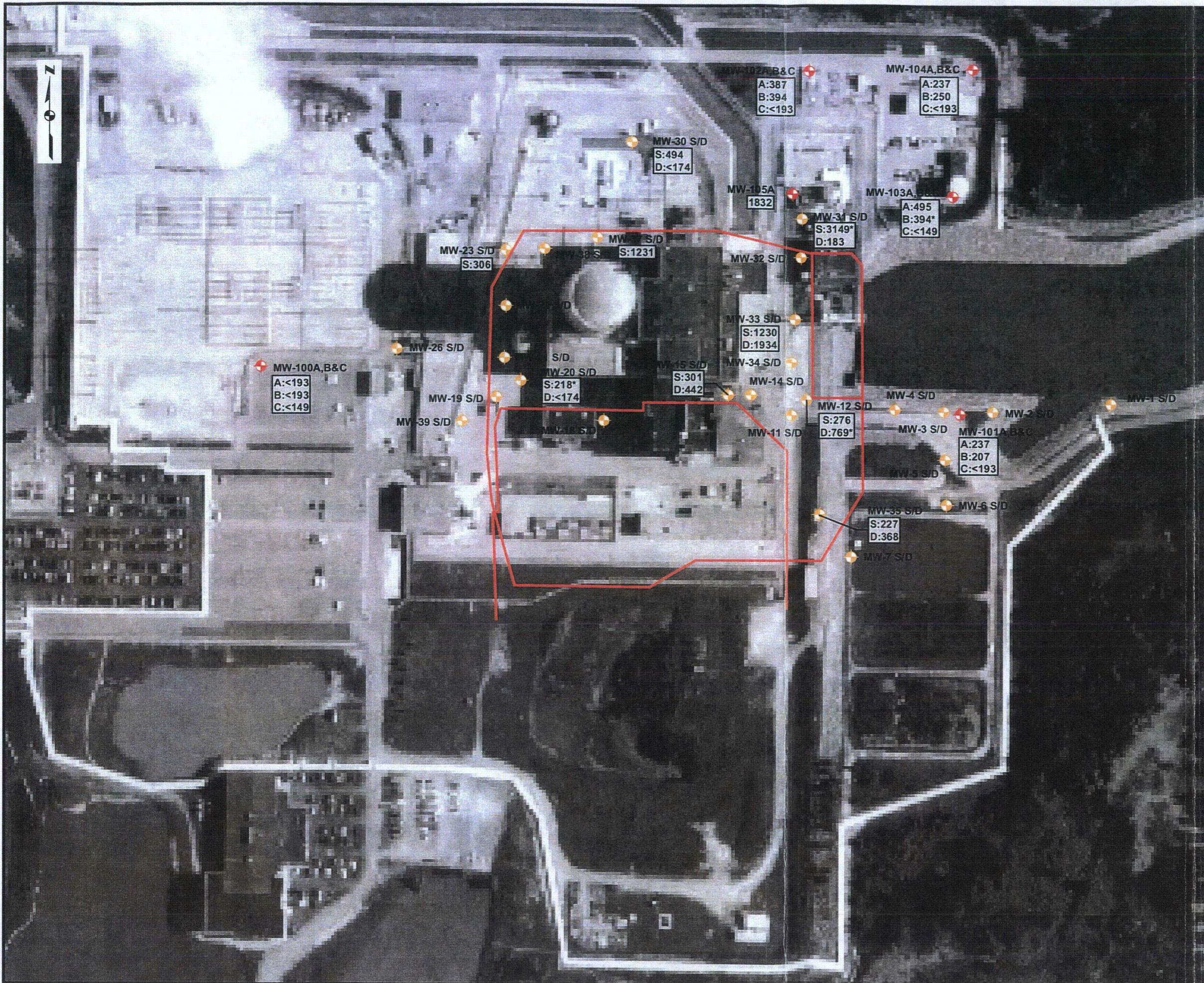


Figure 6 - Groundwater Sample Analytical Results
June to August 2007

Davis-Besse Nuclear Power Station,
Oak Harbor, OH





Legend

- Limits of Grout Curtain
- ◆ Monitoring Well Installed in August 2007
- ◆ Historic Monitoring Well
- A: Till Well
- B/S: Upper Dolomite Well
- C/D: Lower Dolomite Well

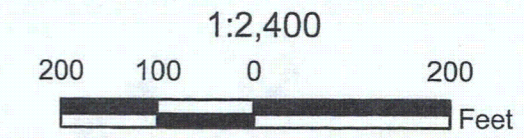
Results:

- 466 Tritium Activity in pCi/L
- <169 Tritium Activity Below Laboratory Lower Limit of Detection (value indicated)
- pCi/L picoCuries per Liter
- * Field Duplicate taken. Highest result shown

Analysis performed by Midwest Laboratory using EPA Method 906.0

Notes:

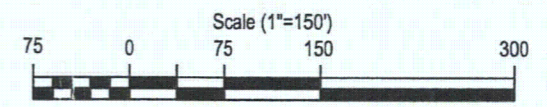
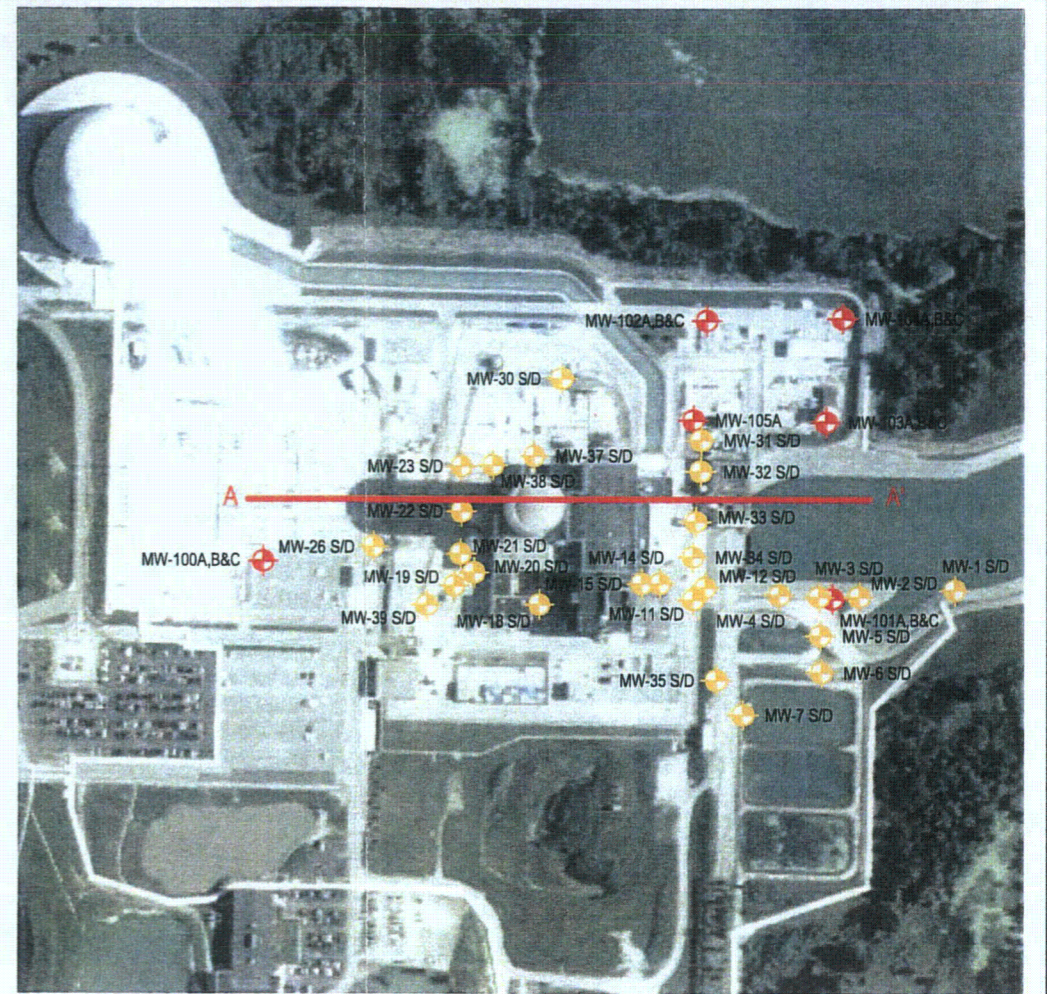
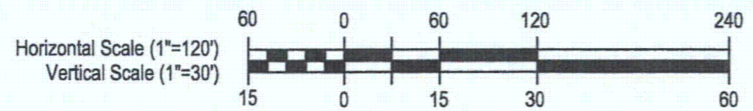
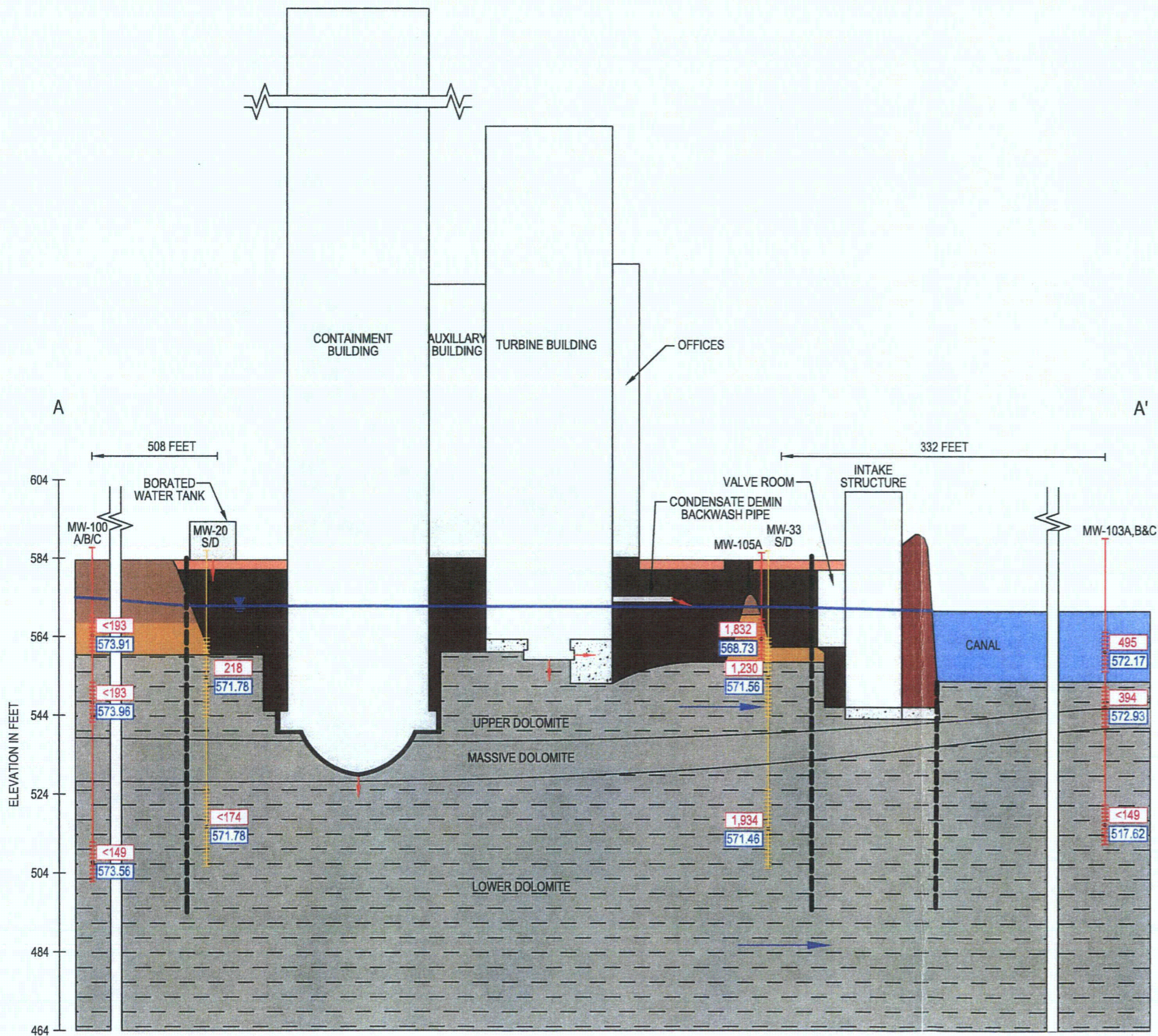
Groundwater monitoring samples were taken between 24 September and 10 October 2007.



**Figure 7 - Groundwater Sample Analytical Results
September/October 2007**

Davis-Besse Nuclear Power Station,
Oak Harbor, OH





Legend

- Symbols**
- Groundwater Elevation (Upper Dolomite)
 - Potential Migration of Tritiated Water
 - Groundwater Flow Direction
 - Monitoring Well Installed in August 2007 (Well projected on cross-section)
 - Historic Monitoring Well (Well projected on cross-section)
 - Grout Curtain
 - Gap in Section
- Results (September/October 2007)**
- 1,832 Tritium Activity in monitoring wells (pCi/L) picoCuries per Liter
 - 568.73 Groundwater Elevation
- Fill and Geologic Units**
- Concrete Fill
 - General Backfill (Earthen)
 - Structural Backfill (Crushed Rock)
 - Wave Protection Dike Fill (Topsoil)
 - Glaciolacustrine Unit
 - Till Unit
 - Laminated Dolomite
 - Massive Dolomite

Figure 8 - Cross-Section Showing Groundwater Elevations and Sample Analytical Results
Davis-Besse Nuclear Power Station, Oak Harbor, OH

Handwritten signature: W. H. ...



Appendix A
Boring Logs

APPENDIX A



ERM
 399 Boylston St. 6th Floor
 Boston, MA 02116
 Telephone: 617-646-7800
 Fax: 617-267-6447

MW-100A MW-100B MW-100C

CLIENT First Energy - Davis-Besse Power Station PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02 PROJECT LOCATION Davis-Besse

DATE STARTED 8/8/07 COMPLETED 8/9/07 GROUND ELEVATION - WELL/BORING DIAMETER 2"

DRILLING CONTRACTOR Bowser-Morner, Inc.

DRILLING METHOD Sonic

LOGGED BY G. Ayres CHECKED BY M. Daly

NOTES Boring size is 6" in overburden and 4" in bedrock

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-100A	WELL DIAGRAM MW-100B	WELL DIAGRAM MW-100C
0									
88		CL-ML		SILTY CLAY with some coarse sand and gravel, cohesive, firm, dry, brown with gray mottling.	PID = NA Micro R = 8	Glaciolacustrine	Cement	Cement	Cement
10		CL-ML		SILTY CLAY with some gravel, cohesive, gravel content decreases with depth, firm, brown.	PID = NA Micro R = 9	Till	Bentonite chips	Bentonite chips	
18.0		CL-ML		SILTY CLAY with gravel, brown.	PID = NA Micro R = 8		Sand	Bentonite chips	
23.0		CL-ML		CLAY WITH SILT and some sand, dark gray.	PID = NA Micro R = 8		Screen		
26.0				dolomite.		Laminated Dolomite	End cap		
30				laminated dolomite, light gray.	PID = NA Micro R = 8				
38.0				laminated dolomite, becomes fractured at 42', light gray.	PID = NA Micro R = 8			Sand	Bentonite chips
44.0					PID = NA Micro R = 8		Screen		
50				no recovery.			End cap	Native backfill	

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 Fax: 617-267-6447

MW-100A MW-100B MW-100C

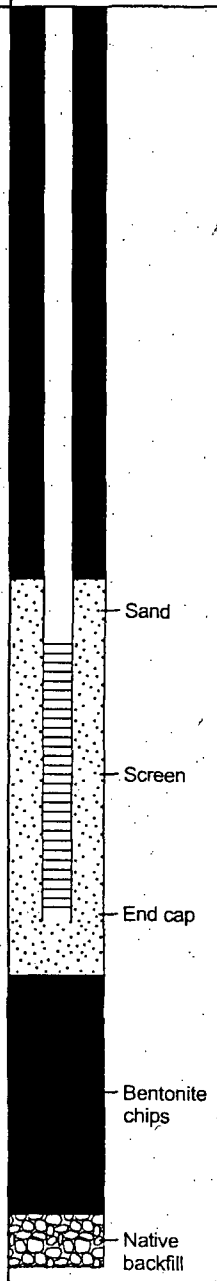
CLIENT First Energy - Davis-Besse Power Station

PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02

PROJECT LOCATION Davis-Besse

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-100A	WELL DIAGRAM MW-100B	WELL DIAGRAM MW-100C
50				no recovery. (continued)					
60					PID = NA Micro R = NA	Massive Dolomite			
60			58.0 59.0	massive dolomite, highly fractured, light gray.					
0			64.0	laminated dolomite, fractured, dark gray.	PID = NA Micro R = 11				
70									
70				laminated dolomite, fractured, olive gray.					
50			73.0		PID = NA Micro R = 10				
80									
80			82.0	laminated dolomite, fractured, dark gray.	PID = NA Micro R = 10	Laminated Dolomite			
50									
90			89.5	laminated dolomite, dark gray.					
90			90.0	massive dolomite, light gray.					
80					PID = NA Micro R = 8				
100				Bottom of boring at 98.0 feet.					

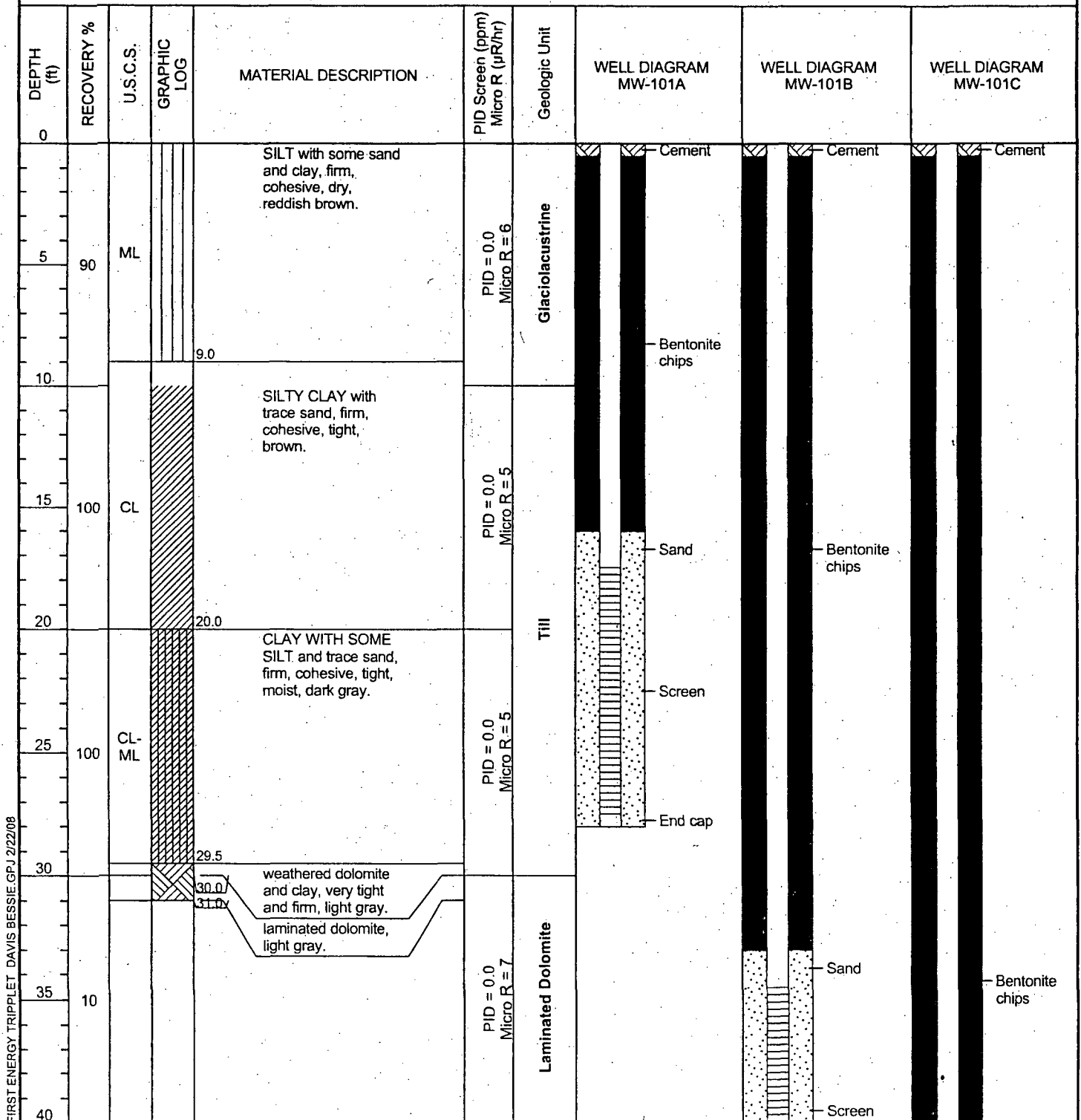


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Boston, MA 02116
Telephone: 617-646-7800
Fax: 617-267-6447

CLIENT First Energy - Davis-Besse Power Station PROJECT NAME Well Construction
 PROJECT NUMBER 0065992.02 PROJECT LOCATION Davis-Besse
 DATE STARTED 8/14/07 COMPLETED 8/15/07 GROUND ELEVATION - WELL/BORING DIAMETER 2"
 DRILLING CONTRACTOR Bowser-Momer, Inc.
 DRILLING METHOD Sonic
 LOGGED BY G. Avres CHECKED BY M. Daly
 NOTES Boring size is 6" in overburden and 4" in bedrock



(Continued Next Page)



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CLIENT First Energy - Davis-Besse Power Station

PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02

PROJECT LOCATION Davis-Besse

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-101A	WELL DIAGRAM MW-101B	WELL DIAGRAM MW-101C
40									
45	80			massive dolomite, fractured, light gray.	PID = 0.0 Micro R = 4	Massive Dolomite			
50				laminated dolomite, gray.	PID = 0.0 Micro R = 4	Laminated Dolomite			
55	70			laminated dolomite, light gray.	PID = 0.0 Micro R = 4				
60				laminated dolomite, light gray to dark gray.	PID = 0.0 Micro R = 4				
65	50			laminated dolomite, dark gray.	PID = 0.0 Micro R = 5				
70				laminated dolomite, dark gray.	PID = 0.0 Micro R = 5				
75	90								
80				Bottom of boring at 80.0 feet.					
85									

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 Fax: 617-267-6447

MW-102A MW-102B MW-102C

CLIENT First Energy - Davis-Besse Power Station PROJECT NAME Well Construction
 PROJECT NUMBER 0065992.02 PROJECT LOCATION Davis-Besse
 DATE STARTED 8/16/07 COMPLETED 8/16/07 GROUND ELEVATION - WELL/BORING DIAMETER 2"
 DRILLING CONTRACTOR Bowser-Morner, Inc.
 DRILLING METHOD Sonic
 LOGGED BY G. Ayres CHECKED BY M. Daly
 NOTES Boring size is 6" in overburden and 4" in bedrock

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-102A	WELL DIAGRAM MW-102B	WELL DIAGRAM MW-102C
0		FILL		1.0 SANDY Asphalt sub-base.			Cement	Cement	Cement
3.0		MLS		3.0 SILT AND SAND with trace clay, firm, cohesive, gray.	PID = 0.0 Micro R = 6	Glaciolacustrine			
12.0	30	MLS		12.0 SILT AND SAND with trace clay, firm, light brown.			Bentonite chips		
14.5	45	CL-ML		14.5 SILTY CLAY with some sand and gravel, firm, cohesive, tight, dry, light brown.	PID = 2.2 Micro R = 7			Bentonite chips	
30.0	100	CL		30.0 CLAY WITH SILT and some sand, firm to hard, cohesive, tight, dry, brown.	PID = 0.6 Micro R = 7	Till	Sand		
31.0		CL		31.0 CLAY WITH SILT and trace sand, firm, cohesive, dark gray.			Screen		
39.5	95			39.5 laminated Dolomite, fractured, gray.	PID = 0.6 Micro R = 5	Laminated Dolomite	End cap Native backfill	Sand	Bentonite chips
40							Screen		

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(Continued Next Page)



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 Fax: 617-267-6447

CLIENT First Energy - Davis-Besse Power Station

PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02

PROJECT LOCATION Davis-Besse

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-102A	WELL DIAGRAM MW-102B	WELL DIAGRAM MW-102C
40									
45	90			massive Dolomite with some fractures, light gray.	PID = 0.6 Micro R = 5	Massive Dolomite			
50				laminated Dolomite, dark gray.					
55	90			laminated Dolomite, light gray to dark gray.	PID = 0.6 Micro R = 5				
60				laminated Dolomite, dark gray.					
65	90			laminated Dolomite, dark gray.	PID = 0.6 Micro R = 5	Laminated Dolomite			
70				laminated Dolomite, dark gray.					
75	80			laminated Dolomite, dark gray.	PID = NA Micro R = 7				
80				Bottom of boring at 80.0 feet.					
85									

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 Boston, MA 02116
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 Fax: 617-267-6447

MW-103A MW-103B MW-103C

CLIENT First Energy - Davis-Besse Power Station

PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02

PROJECT LOCATION Davis-Besse

DATE STARTED 8/21/07 COMPLETED 8/21/07

GROUND ELEVATION - WELL/BORING DIAMETER 2"

DRILLING CONTRACTOR Bowser-Morner, Inc.

DRILLING METHOD Sonic

LOGGED BY G. Avres CHECKED BY M. Daly

NOTES Boring size is 6" in overburden and 4" in bedrock

2

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-103A	WELL DIAGRAM MW-103B	WELL DIAGRAM MW-103C
0				No recovery.					
0					PID = NA Micro R = NA	Glaciolacustrine	Cement	Cement	Cement
10									
10.0									
13.0		CL-ML	[Hatched pattern]	SILT AND CLAY with some sand and trace gravel, firm to soft, cohesive, brown.	PID = 0.6 Micro R = 3		Bentonite chips		
14.0		SM	[Dotted pattern]						
16.0		CL-ML	[Hatched pattern]	SILT AND SAND with some gravel, firm, cohesive, gray.					
20				CLAY with silt, orange mottling, firm, cohesive, gray.				Bentonite chips	
26.0				CLAY WITH SILT and some sand, firm, cohesive, brown.		Till	Sand		
30		CL-ML	[Hatched pattern]		PID = 0.0 Micro R = 6		Screen		
30.0		CLS	[Hatched pattern]	CLAY with some sand and cobble fragments, firm, cohesive, tight, dark gray.					
34.0		CLS	[Hatched pattern]	CLAY with some sand and cobble fragments, firm, cohesive, dark gray.	PID = 0.0 Micro R = 5		End cap		Bentonite chips
36.0				weathered dolomite, white.					
40				laminated dolomite, gray.	PID = 0.0 Micro R = 3	Laminated Dolomite		Sand	
40.0				laminated dolomite, gray.				Screen	
44.0				massive dolomite, gray.		Massive Dolomite		Screen	
48.0								End cap	
50								Native backfill	

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(Continued Next Page)



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CLIENT First Energy - Davis-Besse Power Station

PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02

PROJECT LOCATION Davis-Besse

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-103A	WELL DIAGRAM MW-103B	WELL DIAGRAM MW-103C
90				52.0 laminated dolomite, dark gray. (continued) laminated dolomite, brown to white.	PID = 0.0 Micro R = 4	Laminated Dolomite			
60			58.0 laminated dolomite, dark gray. 59.0 laminated dolomite, brown.	PID = 0.0 Micro R = 4					
80			62.0 laminated dolomite, dark gray.	PID = 0.0 Micro R = NA					
70			68.0 laminated dolomite, dark gray.						
90				79.0 laminated dolomite, dark gray.					
80				Bottom of boring at 80.0 feet.					
100									

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Telephone: 617-646-7800
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MW-104A MW-104B MW-104C

CLIENT First Energy - Davis-Besse Power Station

PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02

PROJECT LOCATION Davis-Besse

DATE STARTED 8/23/07 COMPLETED 8/24/07

GROUND ELEVATION - WELL/BORING DIAMETER 2"

DRILLING CONTRACTOR Bowser-Mormer, Inc.

DRILLING METHOD Sonic

LOGGED BY J.G. Ayres CHECKED BY M. Daly

NOTES Boring size is 6" in overburden and 4" in bedrock.

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-104A	WELL DIAGRAM MW-104B	WELL DIAGRAM MW-104C
0		FILL		GRAVEL					
5	10				PID = 0.6 Micro R = NA	Glaciolacustrine			
10		CL-ML		SILTY CLAY with some sand, trace gravel and cobbles, cohesive, dry, brown.					
15	55	CL-ML		CLAY with trace silt and sand, soft, cohesive, black.	PID = 0.0 Micro R = 8				
20		CL-ML		CLAY with some silt and sand, firm, cohesive, brown.					
25	100	CL-ML		CLAY with some silt and trace sand and gravel, soft, cohesive, dark gray.	PID = 0.6 Micro R = 10	Till			
30		CLS		CLAY with some sand, wet at 32 ft, firm, cohesive, dark gray.					
35	100			weathered dolomite, light gray.	PID = 0.6 Micro R = 8	Laminated Dolomite			
40				laminated dolomite, gray to light gray.					

(Continued Next Page)

FIRST ENERGY TRIPPLET, DAVIS BESSE, GPJ 2/22/08



ERM
 399 Boylston St. 6th Floor
 Boston, MA 02116
 Telephone: 617-646-7800
 Fax: 617-267-6447

CLIENT First Energy - Davis-Besse Power Station

PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02

PROJECT LOCATION Davis-Besse

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-104A	WELL DIAGRAM MW-104B	WELL DIAGRAM MW-104C
40									
42.0				laminated dolomite, gray.		Massive Dolomite			
45.0	50			massive dolomite, light gray.	PID = 0.6 Micro R = 7				
50						Laminated Dolomite			
55.0	70			laminated dolomite, dark gray to white.	PID = 0.0 Micro R = 7				
60				laminated dolomite, gray.					
65.0	90			laminated dolomite, gray.	PID = 0.0 Micro R = 7				
69.0				laminated dolomite, gray to dark gray.					
70						Laminated Dolomite			
75.0	90			laminated dolomite, gray to dark gray.	PID = 0.6 Micro R = 6				
79.0				laminated dolomite, gray to dark gray.					
80				Bottom of boring at 80.0 feet.					
85									

FIRST ENERGY TRIPPLET, DAVIS BESSE, GP-1, 2/22/08



ERM
 399 Boylston St. 6th Floor
 Boston, MA 02116
 Telephone: 617-646-7800
 Fax: 617-267-6447

CLIENT First Energy - Davis-Besse Power Station PROJECT NAME Well Construction

PROJECT NUMBER 0065992.02 PROJECT LOCATION Davis-Besse

DATE STARTED 8/28/07 COMPLETED 8/28/07 GROUND ELEVATION - WELL/BORING DIAMETER 2"

DRILLING CONTRACTOR Bowser-Momer, Inc.

DRILLING METHOD Sonic

LOGGED BY G. Ayres CHECKED BY M. Daly

NOTES Boring size is 6" in overburden and 4" in bedrock

B

DEPTH (ft)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID Screen (ppm) Micro R (µR/hr)	Geologic Unit	WELL DIAGRAM MW-105A	WELL DIAGRAM	WELL DIAGRAM
0									
0 - 2.0		FILL		SANDY SILTY Asphalt sub-base, loose, dry.					Cement
2.0 - 10.0	20				PID = 0.6 Micro R = NA	Glaciolacustrine			Bentonite chips
10.0 - 20.0		ML		CLAYEY SILT with some sand and trace gravel, gray mottling, moist, brown.	PID = 0.6 Micro R = 6				Sand
20.0 - 28.0	100	CL-ML		CLAY WITH SILT and some gravel and sand, wet at 27 ft, weathered bedrock fragments starting at 6.5 ft, dark gray.	PID = 0.6 Micro R = 6	Till			Screen
28.0 - 28.5				weathered bedrock and clay, light gray. Bottom of boring at 28.5 feet.					Native backfill
28.5 - 40.0									

FIRST ENERGY TRIPPLET, DAVIS BESSE, GPL 2/22/08

APPENDIX B

Appendix B
Data Assessment
June & July/August 2007
Monitoring Events

1.0

INTRODUCTION

This section presents a quality assurance and quality control (QA/QC) review of the Davis-Besse June and July/August 2007 well groundwater sampling events. This evaluation was conducted to assess and enhance the reliability and validity of the groundwater analytical data. The verification process was conducted to identify the most common sampling and analytical problems that could affect the quality of the results. In general, the results met the data quality objectives.

2.0

QUALITY ASSURANCE

Quality assurance involves planned and systematic actions necessary to provide confidence in the analytical results. The goal of the program is to have a program that is operating within acceptable criteria; thereby enhancing the representativeness and comparability of the results. Qualitative measures include items related to the field as well as the laboratory activities.

2.1

SAMPLING PROGRAM

The procedures used to collect the groundwater samples were detailed in a FSP (ERM, 8 June 2007). Specifications, such as well locations, well construction, sampling intervals, sampling and analysis techniques were items among others that were described to help collect a useful data set. A list of sampling locations and analytical program summary tables were provided for the July/August 2007 groundwater monitoring event. Groundwater samples were collected by personnel from BETA Laboratory. Field notes were reviewed to confirm that the procedures were executed properly. The following information reviews items that were included in the field sampling quality assurance program.

- **Sampling documentation** - The sample team maintained a field notebook (bound weatherproof logbooks) that was filled out at each location where a sample was collected. It contains the sample designation, collection time, description, and field instrument calibration log. The team also completed a Low-Flow Groundwater Sampling Form at each monitored location. The forms present information regarding location, weather, time, well construction,

sampling depths, sampling device, field parameters and sample containers. The completed Low-Flow Groundwater Sampling forms are included within Appendix B.

- **Sample Identification** - Well IDs were used to identify the groundwater samples. The same codes were used to complete the chain-of-custodies (COCs). Duplicate samples were recorded as blind samples. Actual duplicate sample IDs were recorded on each Low-Flow Groundwater Sampling Form. COC records are included within Appendix B.
- **Decontamination** - Dedicated high density polyethylene (HDPE) tubing was used at each location. Wells were sampled using a peristaltic pump (no decontamination required).
- **Calibration and Preventive Maintenance of Field Instruments** - Sampling team personnel calibrated the geochemical parameters probe every day before starting the sampling. Calibration logs were maintained in the notebook. ORP readings did not stabilize during June sampling of well MW-20D. The ORP probe was cleaned after this sampling and the meter accuracy was successfully checked utilizing calibration solution. Dissolved Oxygen reading could not be taken for about 57% of the wells sampled in July/August 2007 due to probe interference with hydrogen sulfide.
- **Sampling locations** - All locations were sampled as planned in the FSP.
- **Gauging** - A synoptic water level gauging round, including all of the monitoring wells selected for the evaluation of tritium and gamma emitting radionuclides, was performed on 11 June 2007 prior to sampling.
- **Sampling Depths** - Sampling depths were reported on the individual Low-Flow Groundwater Sampling Forms. Sampling depths were consistent with sampling depths recommended in the Field Sampling Plan.
- **Field Duplicates** - All duplicate samples were collected in accordance with the FSP.

ANALYTICAL PROGRAM

Groundwater samples were analyzed by MidWest Laboratory for analysis of tritium by EPA Method 906.0 and gamma emitting radionuclides by EPA Method 901.1 as specified within the FSP. MidWest Laboratory currently performs radiological environmental monitoring for over 20 nuclear power plants in 11 states. In addition, the laboratory is certified to perform analysis of drinking water for radionuclides in Illinois, Indiana, Wisconsin, and Kentucky. Midwest Laboratory maintains a Quality Assurance / Quality Control Program based on 10 CFR Part 50, Appendix B and Reg. Guide 4.15.

QUALITY CONTROL

The analytical data were assessed in terms of precision, accuracy, representativeness, comparability and completeness (PARCCs) to evaluate the usability of the results generated. Quality control items were evaluated through laboratory checks (e.g., matrix spikes, duplicate samples), and sampling method reviews (equipment blanks, trip blanks). In addition, MidWest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of their quality control program in December 1971. Results of the interlaboratory program are presented at the end of this appendix.

The following information provides background on the types of QC samples that were used to assess if the data quality objectives of the sampling program were met.

- **Equipment Blanks** - Equipment blanks are samples collected to evaluate the potential cross-contamination of samples due to the sampling equipment. They are collected by pouring deionized water over the sampling equipment which comes in contact with the groundwater sample. During the June and July/ August 2007 sampling event, all monitoring wells were sampled with dedicated equipment. Therefore, no equipment blanks were collected.
- **Field Duplicate Samples** - Field duplicate samples are analyzed to check the accuracy and reproducibility of the laboratory analytical techniques. A field duplicate sample is taken from the same monitoring well, one immediately after the other using the same sampling device. Field duplicates are typically collected at locations where concentrations of COCs are expected to be present. As recommended in the field sampling plan, two duplicate samples were collected during the June 2007 sampling event (sampling

locations MW-12S and MW-20S), and one during the July/ August sampling event (sampling location MW-32S).

- **Laboratory (Split) Duplicate Samples** - A laboratory duplicate sample is created when the laboratory splits a normal field sample. It is conducted to evaluate the precision of the laboratory. The laboratory conducted the analysis of one laboratory duplicate sample for the July/ August sampling event (duplicate of field duplicate sample from location MW-32S).
- **Matrix Spike and Matrix Spike Duplicate samples** - Matrix spike samples and matrix spike duplicate samples are normal field samples to which a known quantity of a chemical constituent is added in the laboratory. Spike samples are used to evaluate the precision of the laboratory and the effects of matrix interference on the analysis. MS/MSDs are typically collected in areas where concentrations of COCs are expected to be low. Spike samples were collected at MW-26D by collecting two additional samples as identified in Table 3. Samples were spiked by the laboratory with a tritium standard of 5,639 pCi/L and analyzed as actual samples.

Assessment of data quality based on compliance with PARCCs criteria is presented below.

- **Precision** - United States Environmental Protection Agency (EPA) guidance suggests that the Relative Percent Difference (RPD) of field duplicates should be less than 30 percent in water samples. The RPD is calculated as:

$$RPD = \frac{| \text{Sample} - \text{Duplicate} |}{(\text{Sample} + \text{Duplicate}) / 2}$$

Calculated RPD values for the tritium results were within guidelines, as presented in the following table.

Field Duplicate RPD Calculations

Sample ID	Duplicate ID	Sample Result	Duplicate Result	RPD
MW-12S	DBD-01	657	764	15 %
MW-20S	DBD-02	255	279	9 %
MW-32S	DBD-01	7,535	7,185	5 %

- **Accuracy** - Matrix spike/matrix spike duplicate (MS/MSD), and laboratory duplicate sample are documented in the attached laboratory reports. These indicators are used to assess if the matrix may be biasing the reported results high (generally based on greater than 130 percent recovery) or low (generally based on less than 70 percent recovery). RPDs are generally expected to be less than 30 percent between MS and MSD results.

As shown in the following table, all RPDs for tritium and cesium were within acceptable ranges.

Matrix Spike/Matrix Spike Duplicate RPD Calculations

Sample ID	Compound	Duplicate ID	Spike + Initial Sample Activities	Sample Result	RPD
MW-26D	Tritium	MS01-MW-26D	5,639	5,000	12%
MW-26D	Tritium	MSD01-MW-26D	5,639	5,055	11%
MW-26D	Cs-134	MS01-MW-26D	59.3	62.9	6%
MW-26D	Cs-134	MSD01-MW-26D	59.3	59.1	0.3%
MW-26D	Cs-137	MS01-MW-26D	66.3	64.2	3%
MW-26D	Cs-137	MSD01-MW-26D	66.3	70.0	5%

No Cesium was detected in the actual samples. Values indicate actual spike activity.

- **Representativeness and Comparability** - The representativeness and comparability of analytical data was qualitatively evaluated by comparing samples from the same locations for the June 2007 and the July/August 2007 monitoring events.

Groundwater Tritium Results Comparison - 1st & 2nd Sampling rounds

Monitoring Well	June 2007 H-3 Activity	July/August 2007 H-3 Activity	RPD
MW-12S	764	860	12 %
MW-30S	1,307	1,149	13 %
MW-32S	5,838	7,535	25 %
MW-32D	466	507	8 %
MW-33S	2,287	2,702	17 %
MW-33D	2,965	3,271	9 %

NA: Not Applicable

Consistency between the monitoring events indicates that the sample results are representative of the site conditions.

- **Completeness** - Based on review of sampling and laboratory check-in procedures, as well as field and laboratory QA/QC results, the data is considered to be complete and useable.
- **Sensitivity** - The MDCs were consistent with data quality objectives for the gamma emitting radionuclides as they ranged between 1.4 and 14.7 pCi/L. The MDCs were consistent with data quality objectives (at least 200 pCi/L) for tritium with the exception of detection limits of 330 pCi/L at 4 locations during the June 2007 sampling event (MW-1S, MW-1D, and MW-26D). The 200pCi/L value corresponds to an environmental level that would allow evaluating an eventual release of tritium to the environment.

4.0

CONCLUSION

Based on the review of the QA/QC information summarized above, the data meet the data quality objectives defined in the FSP and are usable for the intended purposes of supporting the final selection of locations for new monitoring wells at the site.

Site Name: D 13
 Low-Flow Groundwater Sampling Form

Well ID: 15

Date: 6/12/07

Sampling Personnel: C. Lamb, M. P. ... A. ...

Weather Conditions: 65° sunny winds N. NE 15-20 mph

Time: 8:00 - 10:25

File Name: 15-15 DFMWIS

Total Depth (I.D.): 41.71 ft Screen Length: 30ft

Depth to Water (D.T.W.): ⁽¹⁾ 13.44 ft Well Diameter: 3"

Total Volume Purged: 4.5 gal Casing Type: PVC

Purge Rate: 170 ml/min Sampling Device: Peristaltic Pump

Tubing Type: Polyethylene Measuring Point: TOP OF PVC

Pump Intake (ft below M.P.): 3.0 ft color: 11. tan odor: None slight

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	13.46	150 ml/min	13.88	2734	9.13	7.04	136.2	0.79
5:00	13.47	163 ml/min	13.59	2705	7.16	7.09	175.8	0.62
10:00	13.48	175 ml/min	13.52	2701	6.80	7.14	175.4	0.73
15:00	13.48	175 ml/min	13.50	2704	6.53	7.27	168.0	1.25
20:00	13.48	150 ml/min	13.46	2703	6.56	7.31	158.0	1.27
25:00	13.49	175 ml/min	13.37	2699	6.93	7.28	141.9	0.83
30:00	13.49	190 ml/min	13.47	2704	7.00	7.34	141.1	1.41
35:00	13.50	175 ml/min	13.59	2735	5.88	7.26	32.3	1.51
40:00	13.49	170 ml/min	13.72	2748	2.11	7.02	-74.4	0.96
45:00	13.49	170 ml/min	13.77	2751	1.88	6.99	-57.9	0.65
50:00	13.49	160 ml/min	13.79	2735	2.20	6.96	-79.2	0.87
55:00	13.50	164 ml/min	13.83	2729	2.38	7.09	-104.6	0.65
60:00	13.50	164 ml/min	13.85	2722	2.43	6.99	-99.8	0.90
65:00	13.50	170 ml/min	13.85	2715	2.30	7.08	-105.9	0.60
70:00	13.50	170 ml/min	13.87	2706	2.16	7.10	-116.4	0.57
75:00	13.50	165 ml/min	13.86	2700	2.11	6.92	-107.2	0.69
80:00	13.51	170 ml/min	13.88	2694	2.01	6.93	-108.6	0.49
85:00	13.50	175 ml/min	13.87	2690	1.94	7.02	-117.4	0.99
90:00	13.49	155 ml/min	14.01	2696	2.10	7.04	-116.1	0.88
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1027-1049

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-15 TRITIUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MLW-1D
 Date: 6/12/07
 Sampling Personnel: K.C. Lamb, M. Moriarty, A. Percival
 Weather Conditions: H25 cum 73-80° Clear winds NNE @ 5-10 mph
 Time: 1125-1235
 File Name: DBMWID

Total Depth (I.D.): 83.06' Screen Length: 70'
 Depth to Water (D.T.W.): ⁽¹⁾ 11.82' Well Diameter: 3"
 Total Volume Purged: 3 gal Casing Type: PVC
 Purge Rate: 125 ml/min Sampling Device: Parastatic Pump
 Tubing Type: Polystyrene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 70' color: 27. Yellow/or. slight

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	12.73	195 ml/min	14.65	15248	0.40	6.43	-89.0	6.16
5:00	13.27	170 ml/min	15.52	149670	0.39	6.51	-99.0	2.06
10:00	13.59	145 ml/min	15.66	138779	0.33	6.58	-100.3	2.62
15:00	14.0	145 ml/min	15.71	130714	0.32	6.62	-100.4	6.12
20:00	14.19	115 ml/min	16.16	125151	0.32	6.67	-99.0	2.46
25:00	15.04	120 ml/min	16.35	110425	0.34	6.75	-91.4	0.86
30:00	15.13	120 ml/min	16.35	108257	0.35	6.79	-83.8	1.04
35:00	15.64	120 ml/min	16.24	97600	0.35	6.85	-79.7	0.84
40:00	16.15	124 ml/min	16.26	87607	0.35	6.89	-70.4	0.96
45:00	16.65	124 ml/min	16.24	79670	0.34	6.95	-65.0	0.87
50:00	17.01	125 ml/min	16.17	70008	0.33	7.01	-62.0	0.81
55:00	17.75	125 ml/min	16.12	62257	0.33	7.03	-66.5	1.00
60:00							-66.5	
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 1237-1309

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MLW 1D TRITIUM GAMMA None

- Notes:
- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 - (2) - Stabilization criteria based on three most recent consecutive measurements.
 - (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 - (4) +/- 10% when turbidity is over 10 NTUs.

Note
 (Handwritten note with calculations and corrections)

0.367 = πr^2 for 3"
 (7.46 gives gal)
 Drawdown
 x πr^2 compare to
 gal removed

Site Name: DR
 Low-Flow Groundwater Sampling Form

Well ID: MW-75
 Date: 6/13/07
 Sampling Personnel: C. Lamb Merriam A. Percival
 Weather Conditions: Sunny, clear, 75° Winds NE @ 5 mph.
 Time: 1340
 File Name: DBMW-75
 Total Depth (I.D.): 34.39' Center Screen Length: 24'
 Depth to Water (D.T.W.): (1) 5.74' Well Diameter: 3"
 Total Volume Purged: 3.5 gal. Casing Type: PVC
 Purge Rate: 240 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethelone Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 24' color: clear odor: None

B

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	5.75	270 ml/min	17.11	1776	5.78	7.66	-24.2	1.46
5:00	5.76	210 ml/min	16.93	1777	4.55	7.44	-1.0	1.51
10:00	5.755	210 ml/min.	17.00	1781	4.34	7.34	7.4	0.49
15:00	5.76	210 ml/min.	17.04	1781	4.52	7.37	10.6	0.47
20:00	5.76	245 ml/min.	16.71	1768	4.27	7.38	12.5	0.84
25:00	5.76	245 ml/min.	16.68	1768	4.44	7.36	17.9	0.97
30:00	5.76	245 ml/min.	16.48	1860	4.31	7.31	21.0	0.56
35:00	5.76	245 ml/min.	16.52	1951	1.80	7.20	22.8	0.64
40:00	5.76	235 ml/min.	16.53	1977	0.46	7.19	12.7	0.39
45:00	5.76	235 ml/min.	16.47	1980	0.35	7.20	7.5	0.68
50:00	5.76	235 ml/min.	16.46	1979	0.27	7.21	2.9	0.37
55:00	5.76	238 ml/min.	16.34	1978	0.30	7.21	2.7	0.60
60:00	5.76	240 ml/min.	16.47	1982	0.34	7.21	4.3	0.51
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 1435 - 1453

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-75 TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabalization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW-125

Date: 6/14/07

Sampling Personnel: C. Lamb Morianity, A. Percival

Weather Conditions: 72° sunny, winds NEE 7 mph

Time: 0853 - 0932

File Name: DBMW-125

Total Depth (I.D.): 41.97' ^{outer} Screen Length: 32'

Depth to Water (D.T.W.): ⁽¹⁾ 14.175' Well Diameter: 3"

Total Volume Purged: 2.6 gal Casing Type: PVC

Purge Rate: 250 mL/min. Sampling Device: Parastatic Pump

Tubing Type: Polytholene Measuring Point: TOP OF PVC

Pump Intake (ft below M.P.): 32' color: clear odor: none

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.19	205 mL/min.	18.20	2231	2.23	6.95	140.7	1.88
5:00	14.19	220 mL/min.	18.01	2220	0.85	7.02	112.5	2.35
10:00	14.195	225 mL/min.	17.92	2207	0.55	7.02	79.3	2.94
15:00	14.195	235 mL/min.	17.61	2198	0.48	7.03	52.8	2.55
20:00	14.195	240 mL/min.	17.65	2198	0.44	7.07	30.2	1.71
25:00	14.195	248 mL/min.	17.49	2190	0.43	7.10	21.3	1.88
30:00	14.195	250 mL/min.	17.54	2190	0.40	7.11	21.9	1.30
35:00	14.19	255 mL/min.	17.52	2191	0.36	7.14	14.4	0.94
40:00	14.195	255 mL/min.	17.47	2187	0.34	7.15	18.5	0.87
45:00								
50:00								
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 0933 - 1007

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-125 TRITIUM GAMMA None

DBD-01 TRITIUM GAMMA None

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW 155
 Date: 6/26/97
 Sampling Personnel: C. Lamb, Maricanty, M. Resto
 Weather Conditions: 77° sunny, hot, calm
 Time: 1026
 File Name: DBMW155

Total Depth (I.D.): 43.3' Screen Length: Center 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 13.42' Well Diameter: 3"
 Total Volume Purged: 4 Gal. Casing Type: PVC
 Purge Rate: 215 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 32' color: clear odor: none

48

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	13.44	205 ml/min.	21.94	2625	4.76	7.39	-112.4	1.58
5:00	13.45	190 ml/min.	22.01	2635	2.55	7.39	-144.7	0.33
10:00	13.46	200 ml/min.	22.21	2642	1.52	7.39	-155.1	0.31
15:00	13.46	195 ml/min.	22.24	2636	1.23	7.39	-171.2	0.28
20:00	13.46	205 ml/min.	22.19	2618	1.03	7.39	-171.7	0.45
25:00	13.46	210 ml/min.	22.15	2602	0.83	7.39	-168.1	0.17
30:00	13.46	200 ml/min.	22.18	2593	0.71	7.39	-155.8	0.34
35:00	13.46	200 ml/min.	22.11	2524	0.61	7.39	-167.7	0.21
40:00	13.46	215 ml/min.	22.15	2560	0.55	7.39	-153.0	0.14
45:00	13.46	205 ml/min.	21.77	2516	0.52	7.39	-155.5	0.15
50:00	13.46	210 ml/min.	21.95	2511	0.49	7.38	-145.6	0.20
55:00	13.46	210 ml/min.	22.25	2500	0.46	7.35	-102.4	0.14
60:00	13.46	210 ml/min.	22.24	2486	0.45	7.34	-168.7	0.21
65:00	13.46	215 ml/min.	21.82	2452	0.42	7.34	-168.3	0.15
70:00	13.46	215 ml/min.	21.71	2434	0.41	7.34	-160.6	0.15
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 1144 - 1200

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-155 TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW-15D

Date: 6/26/07

Sampling Personnel: C. Lamb (Majority), M. Rosta

Weather Conditions: 85° HOT

Time: 1315

File Name: DBMW15D

Total Depth (I.D.): 80.58'

Screen Length: 70'

Depth to Water (D.T.W.): ⁽¹⁾ 13.77'

Well Diameter: 3"

Total Volume Purged: 4 gal

Casing Type: PVC

Purge Rate: 240 ml/min

Sampling Device: Peristaltic Pump

Tubing Type: Polyethylene

Measuring Point: TOP OF PVC

Pump Intake (ft below M.P.): 70'

color: low odor: strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	13.78'	235 ml/min	22.83	3976	6.49	7.36	-257.6	4.80
5:00	13.79'	220 ml/min	22.13	4053	1.81	7.32	-294.8	4.43
10:00	13.80'	230 ml/min	22.16	4149	1.22	7.28	-294.8	4.78
15:00	13.79'	235 ml/min	22.05	4205	1.06	7.26	-300.5	6.10
20:00	13.79'	235 ml/min	21.83	4330	0.93	7.25	-307.3	5.59
25:00	13.79'	235 ml/min	21.74	4540	0.74	7.20	-316.5	7.66
30:00	13.79'	240 ml/min	21.21	5038	0.65	7.16	-319.2	9.78
35:00	13.79'	240 ml/min	21.11	5132	0.58	7.14	-319.1	9.15
40:00	13.785'	245 ml/min	21.88	5196	0.57	7.14	-322.3	4.50
45:00	13.79'	250 ml/min	21.20	4740	0.53	7.18	-326.1	7.50
50:00	13.79'	230 ml/min	21.08	5098	0.51	7.15	-325.0	6.65
55:00	13.79'	235 ml/min	20.92	5144	0.49	7.16	-318.9	4.89
60:00	13.79'	235 ml/min	21.03	5164	0.48	7.18	-320.4	4.57
65:00	13.79'	240 ml/min	21.16	5159	0.46	7.19	-319.2	4.25
70:00	13.79'	240 ml/min	21.21	5168	0.46	7.19	-319.5	4.26
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1425 - 1445

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-15D TRITIUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW-185
 Date: 6/14/07
 Sampling Personnel: C. Lamb Moriarity A. Percival
 Weather Conditions: 73°F, Sunny, Wind East @ 6mph
 Time: 10:58-12:01
 File Name: DBMW185

Total Depth (I.D.): 29.27' Screen Length: 25'
 Depth to Water (D.T.W.): ⁽¹⁾ 12.79' Well Diameter: 3"
 Total Volume Purged: 3-3.5 gal Casing Type: PVC
 Purge Rate: 150 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 25' color: clear odor: none

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	13.41	200 ml/min	15.77	1239	1230	8.61	13.7	5.01
5:00	13.83	190 ml/min	15.04	1231	9.63	8.64	18.1	4.72
10:00	14.68	190 ml/min	15.03	1227	9.12	8.61	23.7	5.70
15:00	14.95	160 ml/min	15.22	1230	8.68	8.62	25.7	4.20
20:00	15.76	168 ml/min	15.29	1235	8.9	8.67	28.4	5.89
25:00	15.94	150 ml/min	15.32	1235	8.87	8.69	30.6	5.51
30:00	16.45	155 ml/min	15.42	1238	8.83	8.71	33.7	8.88
35:00	17.30	132 ml/min	15.64	1243	8.53	8.74	39.6	5.26
40:00	17.56	135 ml/min	15.88	1249	8.29	8.76	42.6	6.25
45:00	17.97	137 ml/min	15.95	1252	8.57	8.76	47.5	5.56
50:00	18.53	143 ml/min	16.03	1255	8.58	8.78	49.9	5.55
55:00	18.88	126 ml/min	16.04	1257	8.52	8.79	51.7	4.68
60:00	19.35	150 ml/min	16.22	1260	8.42	8.80	53.2	4.23
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1202-1230

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-185 TRITIUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/-10% when turbidity is over 10 NTUs

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW-18D
 Date: 6/14/02
 Sampling Personnel: C. Lamb Moriarity, A. Percival
 Weather Conditions: 74°F, sunny, E wind @ 11 mph
 Time: 1251-
 File Name: DBMW18D

Total Depth (I.D.): 74.2' Screen Length: 63'
 Depth to Water (D.T.W.): ⁽¹⁾ 12.975' Well Diameter: 3"
 Total Volume Purged: 3.5 gal. Casing Type: PVC
 Purge Rate: 160 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 63' color: clear odor: None

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NIU
Stabilization Criteria*	(see note below)*		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%*
0:00	13.48	212 ml/min.	17.34	6728	1.90	7.62	-145.1	2.36
5:00	13.86	226 ml/min.	17.58	6839	1.82	7.65	-162.0	3.62
10:00	14.50	190 ml/min.	17.40	6842	0.53	7.65	-142.0	2.00
15:00	15.30	188 ml/min.	17.45	6889	0.61	7.67	-159.0	1.47
20:00	15.46	175 ml/min.	17.75	6900	0.51	7.68	-146.2	1.58
25:00	15.84	155 ml/min.	17.77	6915	0.42	7.69	-152.1	1.28
30:00	16.21	178 ml/min.	17.60	6882	0.34	7.69	-152.4	1.33
35:00	16.49	158 ml/min.	17.91	6913	0.29	7.69	-151.4	1.60
40:00	16.70	155 ml/min.	18.30	6999	0.29	7.70	-160.5	1.97
45:00	16.82	158 ml/min.	18.36	7022	0.37	7.70	-162.9	1.61
50:00	16.93	156 ml/min.	18.30	6984	0.33	7.70	-164.2	2.34
55:00	16.95	155 ml/min.	18.29	6992	0.31	7.70	-165.2	2.49
60:00	17.12	160 ml/min.	18.37	6995	0.30	7.70	-160.1	1.92
65:00	17.21	160 ml/min.	18.44	7000	0.28	7.70	-157.3	2.15
70:00	17.24	160 ml/min.	18.43	6997	0.27	7.71	-154.8	1.81
75:00							-154.9	
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 1400-1427
 Samples Collected: Analysis Requested: Preservative: Holding Time: Lab:
MW-18D TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW 205
 Date: 6/25/07
 Sampling Personnel: C. Lomb Moriarity, M. Rosta, J. Wilson
 Weather Conditions: 65° sunny, calm
 Time: 0829
 File Name: DBMW205

Total Depth (I.D.): 42.48 *center* Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 13.39' Well Diameter: 3"
 Total Volume Purged: 5 gal. Casing Type: PVC
 Purge Rate: 250 ml/min Sampling Device: Parastatic Pump
 Tubing Type: polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 32' color: clear odor: none

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	13.41	225 mL/min	14.43	1879	1.77	6.90	178.1	0.91
5:00	13.41	213 mL/min	14.63	1882	0.96	6.90	178.9	1.44
10:00	13.41	215 mL/min	14.55	1881	1.88	6.93	170.6	0.53
15:00	13.41	235 mL/min	14.26	1871	0.87	6.98	158.8	0.63
20:00	13.41	225 mL/min	14.37	1873	0.82	7.01	145.6	0.19
25:00	13.41	235 mL/min	14.28	1868	0.82	7.06	135.9	0.39
30:00	13.41	235 mL/min	14.52	1882	0.79	7.09	122.5	0.32
35:00	13.41	240 mL/min	14.67	1886	0.79	7.13	111.9	0.22
40:00	13.415	250 mL/min	14.53	1882	0.78	7.16	104.7	0.32
45:00	13.41	250 mL/min	14.56	1881	0.78	7.19	100.5	0.39
50:00	13.415	250 mL/min	14.75	1889	0.76	7.21	96.3	0.18
55:00	13.41	260 mL/min	14.86	1897	0.80	7.23	90.0	0.25
60:00	13.415	250 mL/min	14.78	1894	0.81	7.25	88.6	0.22
65:00	13.415	255 mL/min	14.98	1897	0.77	7.26	85.2	0.21
70:00	13.41	260 mL/min	14.82	1961	0.78	7.27	82.8	0.20
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 0941 - 1016
 Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-205 TRITUM, GAMMA NONE
DBD-02 " " "

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

2

SAMPLE

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW 20D

Date: 6/25/07

Sampling Personnel: C. Lamb, Marierity, J. Wilson, M. Rosta

Weather Conditions: 78° Sunny, winds NE @ 0-5 mph

Time: 1035

File Name: DB MW 20D

Total Depth (I.D.): 80.98' center Screen Length: 70'

Depth to Water (D.T.W.): ⁽¹⁾ 13.73' Well Diameter: 3"

Total Volume Purged: 7 gal Casing Type: PVC

Purge Rate: 198 ml/min Sampling Device: Peristaltic Pump

Tubing Type: Polyethylene Measuring Point: TOP OF PVC

Pump Intake (ft below M.P.): 70' color: red odor: none

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NIU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.42	280 ml/min.	16.95	2019	2.06	7.36	15.9	6.67
5:00	14.59	230 ml/min.	16.52	2008	0.75	7.35	31.5	2.99
10:00	14.65	200 ml/min.	16.81	2021	0.51	7.33	27.5	4.79
15:00	14.65	195 ml/min.	16.88	2029	0.48	7.33	35.0	4.52
20:00	14.60	190 ml/min.	16.95	2030	0.44	7.26	43.0	5.17
25:00	14.60	190 ml/min.	16.83	2028	0.44	7.23	42.0	6.14
30:00	14.55	195 ml/min.	16.80	2024	0.43	7.23	36.0	6.88
35:00	14.55	185 ml/min.	16.86	2038	0.44	7.23	34.2	6.30
40:00	14.55	180 ml/min.	16.77	2058	0.43	7.25	27.3	5.03
45:00	14.52	185 ml/min.	17.23	2086	0.34	7.26	21.9	5.35
50:00	14.53	195 ml/min.	17.45	2089	0.33	7.27	28.6	3.27
55:00	14.56	180 ml/min.	17.41	2057	0.34	7.30	21.7	5.15
60:00	14.56	180 ml/min.	17.50	2061	0.33	7.29	19.7	5.78
65:00	14.55	195 ml/min.	17.40	2096	0.28	7.29	26.8	7.22
70:00	14.56	190 ml/min.	17.45	2102	0.27	7.29	25.4	8.02
75:00	14.56	190 ml/min.	17.20	2101	0.26	7.31	26.7	3.67
80:00	14.56	190 ml/min.	17.62	2111	0.25	7.30	23.4	5.50
85:00	14.56	185 ml/min.	17.68	2120	0.26	7.31	13.0	3.06
90:00	14.55	190 ml/min.	17.82	2128	0.24	7.31	8.1	1.55
95:00	14.55	190 ml/min.	17.73	2127	0.25	7.31	-2.4	2.78
100:00	14.56	195 ml/min.	17.74	2128	0.23	7.31	-9.5	3.11
105:00	14.56	195 ml/min.	17.71	2133	0.23	7.31	-2.8	2.65
110:00	14.56	195 ml/min.	17.84	2133	0.23	7.32	-19.6	2.16
115:00	14.56	185 ml/min.	18.14	2150	0.22	7.32	-19.3	2.39
120:00	14.55	175 ml/min.	18.01	2150	0.24	7.32	-27.8	2.97

Handwritten mark

SAMPLE

Sampling Time: 1230 - 1250

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-20D TRITIUM GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft)
- (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW 265
 Date: 6/13/07
 Sampling Personnel: K. Lamb Moriarty A. Percival
 Weather Conditions: Partly Sunny 71° winds NE @ 8mph.
 Time: 0836-0935
 File Name: DBMW265

Total Depth (I.D.): 42.46' Screen Length: 32ft
 Depth to Water (D.T.W.): 13.86ft Well Diameter: 3"
 Total Volume Purged: 4gal Casing Type: PVC
 Purge Rate: 180 ml/min. Sampling Device: Parastatic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 32 ft color: Clear odor: None

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	12.93	250 ml/min	14.36	1947	8.56	7.20	220.4	1.49
5:00	12.93	190 ml/min	14.42	1943	6.57	7.18	240.1	1.57
10:00	12.93	188 ml/min	14.42	1944	6.45	7.24	241.2	0.97
15:00	12.93	185 ml/min	14.46	1947	6.41	7.21	226.6	0.93
20:00	12.93	190 ml/min	14.45	1948	6.40	7.31	239.9	0.83
25:00	12.93	195 ml/min	14.59	1957	6.25	7.38	220.8	1.18
30:00	12.93	180 ml/min	14.76	2017	6.52	7.35	207.1	0.68
35:00	12.93	185 ml/min	15.00	2090	4.71	7.23	201.8	0.70
40:00	12.93	184 ml/min	15.10	2154	1.63	7.15	182.7	0.81
45:00	12.93	190 ml/min	15.27	2185	0.87	7.12	170.7	1.33
50:00	12.93	195 ml/min	15.31	2200	0.54	7.14	132.1	0.78
55:00	12.93	175 ml/min	15.60	2221	0.40	7.14	143.7	0.78
60:00	12.93	175 ml/min	15.38	2208	0.37	7.18	56.0	0.71
65:00	12.93	175 ml/min	15.47	2208	0.33	7.16	45.2	1.01
70:00	12.93	180 ml/min	15.51	2204	0.31	7.18	38.4	1.24
75:00	12.93	185 ml/min	15.38	2202	0.32	7.21	36.9	0.51
80:00	12.93	185 ml/min	15.13	2213	0.37	7.21	36.0	0.88
85:00	12.93	175 ml/min	15.81	2216	0.43	7.17	36.8	1.07
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

652 CRP
SAMPLE

Sampling Time: 0957-1017

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW 265 TRITICUM GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom
- (2) - Stabilization criteria based on three most recent consecutive measurements
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft)
- (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW 26D

Date: 6/13/07

Sampling Personnel: C. Lamb Moriarity, A. Percival

Weather Conditions: 73° sunny, hot, calm

Time: 1034

File Name: MW26D

Total Depth (I.D.): 70' 81.55' ^{center} Screen Length: 70'

Depth to Water (D.T.W.): ⁽¹⁾ 13.70ft Well Diameter: 3"

Total Volume Purged: 3.59gal Casing Type: PVC

Purge Rate: 15.5ml/min. Sampling Device: Parnstaller Pump

Tubing Type: Polyethylene Measuring Point: TOP OF PVC

Pump Intake (ft below M.P.): 70' color: yellow to gray odor: strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
0:00	14.48	16.5 ml/min.	17.03	33676	3.32	7.45	-193.4	3.12
5:00	14.73	18.5 ml/min.	16.88	3448	0.42	7.51	-238.2	2.74
10:00	15.15	17.5 ml/min.	16.65	32765	0.21	7.51	-288.4	3.06
15:00	15.36	16.5 ml/min.	16.73	32376	0.16	7.56	-255.7	3.98
20:00	15.78	16.0 ml/min.	16.88	32212	0.14	7.52	-265.8	2.57
25:00	16.31	15.5 ml/min.	16.28	35334	0.12	7.50	-276.6	1.89
30:00	16.74	15.5 ml/min.	16.29	36158	0.11	7.51	-288.5	3.92
35:00	16.68	15.5 ml/min.	16.71	36616	0.10	7.50	-297.1	2.79
40:00	17.01	15.5 ml/min.	16.61	37125	0.10	7.52	-302.1	2.45
45:00	17.38	15.5 ml/min.	16.60	38368	0.08	7.50	-306.6	1.59
50:00	17.60	15.2 ml/min.	16.97	37746	0.07	7.51	-309.3	1.59
55:00	17.75	15.2 ml/min.	16.95	41971	0.05	7.50	-311.1	1.07
60:00	17.88	15.3 ml/min.	16.91	43185	0.04	7.51	-308.9	1.06
65:00	18.07	15.6 ml/min.	16.35	44018	0.04	7.55	-308.3	1.10
70:00	18.28	15.5 ml/min.	17.22	42592	0.05	7.55	-307.3	0.86
75:00	18.45	15.5 ml/min.	17.18	43374	0.04	7.58	-302.7	0.93
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1154-1313

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-26D
MSOI-MW-26D
MSDOI-MW-26D

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft)
- (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW-305
 Date: 6/27/07
 Sampling Personnel: As. Lumb Muriarita M. Rosta
 Weather Conditions: 76° sunny, humid.
 Time: 0820
 File Name: DBMW305

Total Depth (I.D.): 40.85 Screen Length: 30'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.23' Well Diameter: 3"
 Total Volume Purged: 25 gal. Casing Type: PVC
 Purge Rate: 235 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 30' color: clear odor: none

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.24'	210 ml/min.	18.42	2194	10.77	6.76	187.4	1.06
5:00	14.24'	225 ml/min.	17.59	2164	8.42	6.83	225.7	0.99
10:00	14.24'	215 ml/min.	17.66	2161	7.75	7.03	205.4	0.75
15:00	14.25'	220 ml/min.	17.56	2156	7.22	7.13	164.8	1.04
20:00	14.25'	230 ml/min.	17.51	2153	7.30	7.01	143.7	1.13
25:00	14.25'	225 ml/min.	17.70	2160	7.34	7.37	127.2	0.96
30:00	14.25'	225 ml/min.	17.56	2156	7.23	7.13	120.9	0.98
35:00	14.26'	225 ml/min.	17.50	2155	6.90	7.24	114.6	0.82
40:00	14.25'	230 ml/min.	17.58	2162	3.54	6.97	107.9	0.59
45:00	14.25'	235 ml/min.	17.59	2177	2.61	7.02	56.5	0.77
50:00	14.25'	225 ml/min.	17.52	2149	1.51	7.05	25.8	0.59
55:00	14.25'	230 ml/min.	17.66	2203	1.04	7.34	-54.4	0.62
60:00	14.25'	230 ml/min.	17.60	2207	0.94	7.02	-52.4	0.50
65:00	14.25'	230 ml/min.	17.66	2213	0.78	7.02	-20.1	0.44
70:00	14.26'	235 ml/min.	17.74	2222	0.73	7.06	-66.8	0.40
75:00	14.26'	235 ml/min.	17.75	2223	0.73	7.01	-65.2	0.36
80:00	14.26'	235 ml/min.	17.77	2224	0.71	7.04	-65.6	0.44
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

61

12.8%

SAMPLE

Sampling Time: 0940 - 1000

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-305 TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW 325
 Date: 10/25/07
 Sampling Personnel: C. Lamb Morian, M. Rosta
 Weather Conditions: 83° sunny, calm, hot
 Time: 1321
 File Name: DBMW325

67

Total Depth (I.D.): CLM 2 center
 Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.13' Well Diameter: 3"
 Total Volume Purged: 4.5900 Casing Type: PVC
 Purge Rate: 185 ml/min Sampling Device: Parastatic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 32' color: lt. yellow odor: None

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.18	305 ml/min.	21.91	2324	0.57	7.20	-85.4	>9.99
5:00	14.16	205 ml/min.	22.59	2348	0.47	7.26	-86.9	79.99
10:00	14.16	205 ml/min.	22.79	2368	0.42	7.26	-70.5	79.99
15:00	14.17	210 ml/min.	22.79	2371	0.32	7.29	-77.0	79.99
20:00	14.18	200 ml/min.	22.80	2430	0.68	7.38	-96.1	79.99
25:00	14.18	190 ml/min.	22.70	2388	0.32	7.34	-97.7	79.99
30:00	14.18	190 ml/min.	22.34	2350	0.25	7.32	-95.4	6.37
35:00	14.16	195 ml/min.	22.26	2345	0.25	7.32	-85.7	6.56
40:00	14.17	190 ml/min.	22.39	2353	0.23	7.34	-87.1	3.80
45:00	14.17	210 ml/min.	22.41	2355	0.24	7.34	-82.3	2.30
50:00	14.18	190 ml/min.	22.51	2357	0.26	7.31	-84.4	2.70
55:00	14.17	190 ml/min.	22.58	2361	0.27	7.32	-82.7	3.81
60:00	14.17	190 ml/min.	22.70	2366	0.26	7.31	-85.3	4.15
65:00	14.17	155 ml/min.	22.74	2367	0.23	7.35	-87.7	2.78
70:00	14.17	180 ml/min.	22.68	2365	0.22	7.34	-84.2	2.83
75:00	14.17	185 ml/min.	22.92	2369	0.21	7.35	-86.0	1.30
80:00	14.18	185 ml/min.	22.95	2373	0.21	7.34	-86.4	2.89
85:00	14.17	185 ml/min.	22.69	2362	0.21	7.35	-84.2	2.63
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

23.00°C

SAMPLE

Sampling Time: 1440 - 1458

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-325 TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW-32D
 Date: 6/26/07
 Sampling Personnel: C. Lamb, M. Moriarty, M. Rosta
 Weather Conditions: 71° Sunny
 Time: 0830
 File Name: DBMW32D

Total Depth (I.D.): 80.97' ^{Water} Screen Length: 71'
 Depth to Water (D.T.W.) ⁽¹⁾: 14.3' Well Diameter: 3"
 Total Volume Purged: 3.5 gal - 40 gal Casing Type: PVC
 Purge Rate: 230 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 71' color: 15.3 mg/L odor: Strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.77	220 ml/min	20.76	13055	1.17	6.85	-349.7	1.39
5:00	14.99	235 ml/min	20.72	13061	0.64	6.86	-353.1	1.41
10:00	15.10	215 ml/min	20.66	13002	0.75	6.87	-348.7	1.43
15:00	15.16	210 ml/min	20.77	13061	0.54	6.87	-352.8	1.33
20:00	15.21	215 ml/min	20.78	13099	0.42	6.89	-351.1	1.50
25:00	15.27	220 ml/min	20.78	13217	0.28	6.90	-351.3	0.74
30:00	15.33	220 ml/min	20.68	13422	0.31	6.91	-351.7	0.44
35:00	15.35	220 ml/min	20.65	14608	0.34	6.89	-354.3	0.44
40:00	15.35	220 ml/min	20.78	15032	0.33	6.89	-354.4	0.59
45:00	15.35	220 ml/min	20.80	15182	0.33	6.90	-354.9	0.39
50:00	15.41	235 ml/min	20.71	15207	0.29	6.90	-352.8	0.39
55:00	15.43	230 ml/min	20.63	15335	0.29	6.90	-357.8	0.53
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

0.30*
SAMPLE

Sampling Time: 0930-0950

Samples Collected: MW32D Analysis Requested: TRITIUM GAMMA Preservative: NONE Holding Time: _____ Lab: _____

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) - +/- 10% when turbidity is over 10 NTUs.

Site Name: 015
 Low-Flow Groundwater Sampling Form

Well ID: MW-335
 Date: 6/27/07
 Sampling Personnel: C. Lamb, Marjorie, M. Roster
 Weather Conditions: 80° HOT, HUMID, CLOUDY
 Time: 1040
 File Name: DBMW335

Total Depth (I.D.): 81.85' Center Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 13.60' Well Diameter: 3"
 Total Volume Purged: 4 gal Casing Type: PVC
 Purge Rate: 240 gal/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 32' color: yellow odor: NONE

Time (min)	DTW (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	13.61	222 ml/min	25.47	2635	4.54	7.14	72.7	4.92
5:00	13.62	230 ml/min	24.99	2658	2.16	7.16	56.2	5.57
10:00	13.62	220 ml/min	24.97	2660	1.71	7.19	40.8	5.24
15:00	13.615	230 ml/min	24.68	2654	1.44	7.17	28.0	7.04
20:00	13.615	230 ml/min	24.92	2652	1.21	7.17	16.0	2.46
25:00	13.61	215 ml/min	24.85	2636	1.30	7.17	13.6	4.08
30:00	13.60	225 ml/min	24.72	2624	1.30	7.16	14.2	3.15
35:00	13.62	245 ml/min	24.65	2612	1.20	7.17	6.5	2.44
40:00	13.62	235 ml/min	24.62	2606	1.05	7.17	11.4	1.97
45:00	13.61	235 ml/min	24.92	2607	1.05	7.18	6.5	1.80
50:00	13.62	240 ml/min	25.18	2616	1.07	7.19	4.0	1.94
55:00	13.62	250 ml/min	25.25	2615	1.00	7.20	-0.8	1.81
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

8

SAMPLE

Sampling Time: 1140 - 1155

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-335 TRITILEM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DB
 Low-Flow Groundwater Sampling Form

Well ID: MW-33D
 Date: 6/27/07
 Sampling Personnel: C. Luna, Maricela M. Rosta
 Weather Conditions: 88° sunny hot humid winds SE @ 0-5 mph
 Time: 1203
 File Name: DBMW33D

Total Depth (I.D.): 43.05' Screen Length: 70'
 Depth to Water (D.T.W.): ⁽¹⁾ 3.89' Well Diameter: 3"
 Total Volume Purged: 1 1/2 gal Casing Type: PVC
 Purge Rate: 215 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 70' color: clear odor: strong

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.02	200 ml/min	26.32	5073	12.16	7.15	-276.5	1.17
5:00	14.09	215 ml/min	25.21	5972	1.53	7.07	-321.2	1.18
10:00	14.09	200 ml/min	25.03	5994	1.05	7.04	-323.8	1.06
15:00	14.09	215 ml/min	24.74	6147	0.57	7.04	-325.0	0.98
20:00	14.10	220 ml/min	24.74	6254	0.90	7.03	-320.5	0.67
25:00	14.11	215 ml/min	24.91	6720	0.72	7.00	-326.0	0.45
30:00	14.11	215 ml/min	24.84	7203	0.64	6.97	-330.4	0.57
35:00	14.11	220 ml/min	24.92	7525	0.55	6.97	-329.7	0.42
40:00	14.11	225 ml/min	24.70	7548	0.51	6.97	-324.7	0.38
45:00	14.10	210 ml/min	25.05	7262	0.47	6.97	-322.8	0.26
50:00	14.10	190 ml/min	25.22	7551	0.45	6.97	-322.4	0.39
55:00	14.10	215 ml/min	24.86	7517	0.44	6.97	-322.4	0.32
60:00	14.11	215 ml/min	24.86	7471	0.42	6.97	-322.5	0.29
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1317-1344

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-33D TRITOLIUM GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW 125

Date: 8-6-07

Sampling Personnel: KEVIN BRACE, MIJ ROSTA, AM PECIUAL

Weather Conditions: V HOT MOSTLY SUNNY, 91°F slight breeze

Time: 12:59 pm 8/6/07 1228

File Name: DB 125

Total Depth (I.D.): 41.96 Center Screen Length: 32'

Depth to Water (D.T.W.): (1) 14.40' Well Diameter: 3"

Total Volume Purged: 492l Casing Type: PVC

Purge Rate: 195 Sampling Device: peristaltic pump

Tubing Type: polyethylene Measuring Point: top of PVC

Pump Intake (ft below M.P.): 32' color: Clear odor: None

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 0.3%/C	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.43'	230 ml/min	18.82	2293	2.51	7.29	-87.0	0.45
5:00	14.42'	194 ml/min	19.74	2276	2.74	7.27	-79.0	0.74
10:00	14.42'	194 ml/min	19.79	2267	3.20	7.27	-74.6	0.47
15:00	14.43'	198 ml/min	19.60	2254	3.47	7.27	-70.4	0.17
20:00	14.43'	200 ml/min	19.58	2236	3.70	7.27	-68.0	0.44
25:00	14.42'	196 ml/min	19.49	2222	3.81	7.27	-63.9	0.24
30:00	14.42'	202 ml/min	19.62	2225	4.08	7.27	-60.9	0.28
35:00	14.42'	198 ml/min	19.66	2218	4.19	7.27	-58.7	0.54
40:00	14.42'	202 ml/min	19.53	2214	4.31	7.27	-54.6	0.17
45:00	14.42'	212 ml/min	20.28	2212	4.52	7.27	-52.6	0.11
50:00	14.43'	182 ml/min	20.44	2208	4.91	7.27	-47.1	0.29
55:00	14.43'	184 ml/min	20.51	2211	4.85	7.27	-41.3	0.45
60:00	14.43'	176 ml/min	20.23	2197	5.06	7.27	-43.6	0.13
65:00	14.43'	170 ml/min	20.11	2188	5.50	7.27	-41.3	0.11
70:00			20.16	2185	5.52	7.27	-44.3	0.15
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1352-1355

Samples Collected: MW-125 Analysis Requested: Tritium Preservative: None Holding Time: N/A Lab: ENVIRONMENTAL INC Midwest Lab

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.3 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: Davis Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW 12D
 Date: 8-6-07
 Sampling Personnel: EG MURDOCK, MJ POSTA, AM PERCIVAL B
 Weather Conditions: V HOT SUNNY, SLIGHT BREEZE, 94°F
 Time: 1547 1443
 File Name: DB 12D

Total Depth (I.D.): 81.12 Screen Length: Center 71'
 Depth to Water (D.T.W.): 14.36 Well Diameter: 3"
 Total Volume Purged: 3.0 gal Casing Type: PVC
 Purge Rate: 180 ml/min Sampling Device: Peristaltic pump
 Tubing Type: gal. ethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 71' color: less odor: sulfur smell

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 0.3% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.40	170 ml/min	20.16	3893	3.59	7.19	-294.5	1.03
5:00	14.39	192 ml/min	19.67	3921	2.32	7.18	-290.6	1.40
10:00	14.39	170 ml/min	20.68	3891	1.64	7.18	-291.4	1.52
15:00	14.39	188 ml/min	20.17	3877	0.78	7.17	-298.9	2.46
20:00	14.38	184 ml/min	20.14	3851	0.28	7.17	-304.0	1.15
25:00	14.38	178 ml/min	20.22	3810	0.21	7.17	-307.9	1.77
30:00	14.37	182 ml/min	20.14	3805	0.27	7.17	-308.2	2.62
35:00	14.38	180 ml/min	20.24	3781	0.22	7.17	-308.2	2.90
40:00	14.38	178 ml/min	20.17	3775	0.23	7.17	-309.0	1.52
45:00	14.36	172 ml/min	20.55	3774	0.25	7.17	-308.4	1.23
50:00	14.37	170 ml/min	20.81	3762	0.23	7.18	-307.1	1.59
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1543-1547
 Samples Collected: MW 12D Analysis Requested: Tritium Preservative: None Holding Time: N/A Lab: Environmental Inc Midwest Lab

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis-Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW-30S

Date: 8/2/07

Sampling Personnel: E. Murdock, M.T. Resta

Weather Conditions: very hot, Sunny 94°

Time: 1845 08/07 1715

File Name: DB30S

Total Depth (I.D.): 42.93' Screen Length: Center 30'

Depth to Water (D.T.W.): ⁽¹⁾ 14.42' Well Diameter: 3"

Total Volume Purged: 3 gallons Casing Type: PVC

Purge Rate: 208 mL/min Sampling Device: peristaltic pump

Tubing Type: polyethylene Measuring Point: top of PVC pipe

Pump Intake (ft below M.P.): 30' color: clear odor: none

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.42	220 mL/min	17.48	2533	999	7.31	85.5	
5:00	14.44	204 mL/min	17.61	2529		7.28	82.0	1.33
10:00	14.44	207 mL/min	17.44	2530		7.26	80.1	1.10
15:00	14.44	206 mL/min	17.33	2540		7.23	79.1	0.83
20:00	14.44	208 mL/min	17.26	2526		7.27	-54.0	0.22
25:00	14.44	210 mL/min	17.23	2531		7.26	-83.6	0.54
30:00	14.44	212 mL/min	17.13	2521		7.22	-94.9	0.15
35:00	14.44	210 mL/min	17.23	2529		7.31	-104.9	0.34
40:00								
45:00								
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75:00								
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110:00								
115:00								
120:00								

Sampling Time: 1842-1848

Samples Collected: MW-30S Analysis Requested: Tritium Preservative: None Holding Time: N/A Lab: Environmental Inc. Midwest Lab

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-30D
 Date: 8/3/07
 Sampling Personnel: EG MURDOCK, MJ ROSTA
 Weather Conditions: 85°F, MOSTLY SUNNY, HUMID
 Time: 10:25 AM 8/3/07 0930
 File Name: DA 30D

Total Depth (I.D.): 80.98 Center Screen Length: 70'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.3% Well Diameter: 3"
 Total Volume Purged: 2.5 gal Casing Type: PVC
 Purge Rate: 200 ml/min Sampling Device: Peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC pipe
 Pump Intake (ft below M.P.): 70' color: LT GRAY odor: sv. FUF smell

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%/C	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	15.11	180 ml/min	16.98	29723	999	7.09	-349.1	2.34
5:00	15.42	172 ml/min	17.68	30742	999	7.09	-352.7	1.91
10:00	15.67	200 ml/min	17.56	30254	999	7.07	-345.5	1.46
15:00	15.94	190 ml/min	17.52	30626	999	7.01	-365.4	1.39
20:00	15.12	204 ml/min	17.63	31759	999	7.01	-365.0	1.13
25:00	16.26	200 ml/min	17.60	32778	999	6.98	-381.9	0.72
30:00	16.48	200 ml/min	17.60	33516	999	6.99	-364.8	0.58
35:00	16.54	200 ml/min	17.58	34198	999	6.97	-364.8	0.46
40:00	16.68	210 ml/min	17.65	34778	999	6.94	-365.6	0.37
45:00								
50:00								
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115:00								
120:00								

Sampling Time: 10:27-10:30

Samples Collected: MW-30D Analysis Requested: Tritium Preservative: None Holding Time: N/A Lab: Environmental Inc. Midwest Lab

Notes
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW-315
 Date: 7/31/07
 Sampling Personnel: C. Lambrianity, Emurdock, A., Percival, M. Rosta *B*
 Weather Conditions: 80° sunny, hot
 Time: 11:05
 File Name: DB315

Total Depth (I.D.): ^{As of 7/31/07} 43.54' Center Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.42' Well Diameter: 3"
 Total Volume Purged: 3 gal Casing Type: PVC
 Purge Rate: 190 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 32 color: H. orange / odor: SLIGHT yellow

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria*	(see note below)*		+/- 0.3% ^o	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ^a
0:00	14.41	230 ml/min	23.3	2507	0.92	7.24	-106.0	2.47
5:00	14.43	172 ml/min	23.53	2503	0.94	7.24	-119.9	2.17
10:00	14.43	180 ml/min	23.16	2504	0.60	7.23	-105.3	2.26
15:00	14.42	186 ml/min	23.21	2497	0.57	7.24	-131.7	0.70
20:00	14.42	196 ml/min	23.40	2496	0.61	7.24	-126.6	0.72
25:00	14.42	188 ml/min	23.36	2498	0.56	7.24	-124.1	0.89
30:00	14.42	192 ml/min	23.33	2496	0.56	7.24	-124.9	1.43
35:00	14.42	188 ml/min	23.51	2490	0.65	7.24	-116.7	0.78
40:00	14.42	188 ml/min	23.52	2490	0.63	7.24	-118.2	1.75
45:00	14.42	188 ml/min	23.44	2491	0.69	7.23	-110.6	1.30
50:00	14.42	188 ml/min	23.54	2481	0.67	7.23	-113.1	1.64
55:00	14.42	190 ml/min	23.54	2484	0.66	7.23	-116.2	1.70
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100:00								
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110:00								
115:00								
120:00								

Sampling Time: 12:14 - 12:16

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-315 TRITIUM NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis-Besse
 Low-Flow Groundwater Sampling Form
 on P 7/31/87

Well ID: MW-315 D
 Date: 7/31/87
 Sampling Personnel: C. Lamb, M. J.arity, E. Murdock, A. Perival, J
 Weather Conditions: Sunny, Breeze, 82°F
 Time: 1240
 File Name: DB31D

Total Depth (I.D.): 81.85' ^{Center} Screen Length: 71'
 Depth to Water (D.T.W.): ⁽¹⁾ 15.01' Well Diameter: 3"
 Total Volume Purged: 30 gal Casing Type: PVC
 Purge Rate: 160 ml/min Sampling Device: peristaltic
 Tubing Type: Polyethylene Measuring Point: Top of Pipe PVC
 Pump Intake (ft below M.P.): 71' color: clear odor: Yes - strong S

6

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 0.3% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	15.83	2.05 ml/min	23.17	23200	1.37	7.25	-269.5	2.91
5:00	16.36	2.15 ml/min	22.80	23100	2.31	7.25	-271.0	2.13
10:00	16.71	1.62 ml/min	23.26	23070	3.84	7.25	-269.9	2.30
15:00	17.18	1.60 ml/min	23.31	23040	8.10	7.24	-271.6	0.39
20:00	17.45	1.62 ml/min	23.28	22990	5.07	7.23	-270.3	0.42
25:00	17.73	1.65 ml/min	23.39	22870	0.73	7.20	-274.5	0.66
30:00	17.94	1.60 ml/min	23.36	22840	0.45	7.18	-278.5	0.76
35:00	18.12	1.60 ml/min	23.28	22760	0.40	7.17	-276.5	0.74
40:00	18.25	1.66 ml/min	23.41	22610	0.39	7.16	-277.2	0.74
45:00	18.38	1.60 ml/min	23.49	22540	0.39	7.15	-278.8	0.58
50:00	18.52	1.60 ml/min	23.37	22410	0.55	7.12	-286.5	0.37
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120:00								

SAMPLE

Sampling Time: 1345 - 1348

Samples Collected: MW-31D Analysis Requested: TRITIUM Preservative: NONE Holding Time: Lab:

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis House
 Low-Flow Groundwater Sampling Form

Well ID: MW-32S
 Date: 7/31/04
 Sampling Personnel: C.M. Mirosta, A. Perceval, E. Murdock
 Weather Conditions: Hot, sunny, 82°F
 Time: 1426
 File Name: DB32S
 Total Depth (I.D.): 43.25' Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.23 Well Diameter: 3"
 Total Volume Purged: 2.5 gal Casing Type: PVC
 Purge Rate: 200 mL/min. Sampling Device: peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC pipe
 Pump Intake (ft below M.P.): 32' color: yellow odor: None

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 0.3% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.28'	200 mL/min.	22.33	2506	5.91	7.24	-70.7	6.54
5:00	14.28'	210 mL/min.	22.19	2506	6.78	7.23	-66.4	1.12
10:00	14.28'	218 mL/min.	21.77	2510	7.82	7.23	-72.5	2.19
15:00	14.29'	188 mL/min	22.27	2498	7.81	7.23	-70.0	1.62
20:00	14.28'	189 mL/min	21.78	2497	7.78	7.24	-77.3	0.99
25:00	14.28'	191 mL/min	21.87	2492	7.78	7.24	-76.2	0.55
30:00	14.28'	202 mL/min	21.78	2493	7.86	7.24	-81.7	0.35
35:00	14.28'	198 mL/min	21.62	2493	7.74	7.24	-87.6	0.76
40:00	14.28'	198 mL/min	21.62	2494	7.76	7.24	-88.2	0.95
45:00	14.28'	198 mL/min	21.55	2493	7.74	7.24	-90.0	0.92
50:00	14.28'	200 mL/min	21.57	2492	7.75	7.24	-92.0	0.82
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115:00								
120:00								

SAMPLE

Sampling Time: 1516-1522

Samples Collected: MW-32S Analysis Requested: TRITIUM Preservative: NONE Holding Time: Lab:
DBD-01 TRITIUM NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis - Bessie
 Low-Flow Groundwater Sampling Form

Well ID: MW-32D
 Date: 8/1/07
 Sampling Personnel: E. Murdoch, M.J. Rosta, A. Percival
 Weather Conditions: 76°F sunny
 Time: 1447-1556 hrs/10/12
 File Name: DB32D

Total Depth (I.D.): 81.08' Center Screen Length: 71'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.49' Well Diameter: 3"
 Total Volume Purged: 5 gal Casing Type: PVC
 Purge Rate: 220 mL/min Sampling Device: peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC pipe
 Pump Intake (ft below M.P.): 71' color: clear odor: sulfur smell

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 0.3%/C	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.79'	132 mL/min	21.23	16280	1.65	6.82	-336.7	2.50
5:00	15.03'	214 mL/min	21.04	16440	10.83	6.79	-340.7	0.29
10:00	15.22'	222 mL/min	21.00	16360	14.13	6.77	-342.0	0.25
15:00	15.31'	226 mL/min	21.05	16200	16.52	6.77	-339.4	2.63
20:00	15.39'	228 mL/min	20.83	16010	18.25	6.76	-339.0	2.63
25:00	15.49'	218 mL/min	21.24	15990	19.97	6.77	-326.3	0.74
30:00	14.52'	232 mL/min	21.29	15700	20.07	6.78	-335.3	0.72
35:00	15.58'	238 mL/min	21.28	15590	20.20	6.77	-341.2	0.39
40:00	15.59'	226 mL/min	21.31	15470	20.31	6.77	-339.6	0.44
45:00	15.53'	202 mL/min	21.42	15370	20.03	6.79	-339.5	0.55
50:00	15.51'	208 mL/min	21.57	15300	20.15	6.79	-342.7	0.54
55:00	15.52'	204 mL/min	21.40	15280	20.20	6.79	-342.5	0.39
60:00	15.52'	210 mL/min	21.79	15070	20.40	6.79	-348.8	0.51
65:00	15.53'	208 mL/min	21.46	15050	20.37	6.80	-351.4	0.37
70:00								
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15.52' MJR 8/1/07

sample

Sampling Time: 1147-1150

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-32D TRITIUM NONE N/A Midwest Environmental Lab, Inc.

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS-BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-33D

Date: 3/2/07

Sampling Personnel: E. Murdock, A. Percival, M. Rosta

Weather Conditions: SUNNY, TTF, winds SW

Time: 12:20 3/2/07 11013

File Name: DBML033D

Total Depth (I.D.): 80.67' Center Screen Length: 70'

Depth to Water (D.T.W.): (1) 14.12' Well Diameter: 3"

Total Volume Purged: 5.0 Casing Type: PVC

Purge Rate: 185 Sampling Device: peristaltic pump

Tubing Type: polyethylene Measuring Point: top of PVC pipe

Pump Intake (ft below M.P.): 7.1' color: Clear odor: Sulfur Smell

start

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 0.3% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.31'	172 ml/min	26.08	6534	999	6.90	-262.3	0.38
5:00	14.32'	174 ml/min	26.07	6448	999	6.90	-275.8	0.93
10:00	14.33'	178 ml/min	25.72	6293	11	6.67	-287.0	0.85
15:00	14.22	182 ml/min	25.71	6133	999	6.74	-296.9	0.72
20:00	14.33	176 ml/min	25.64	6063	999	6.65	-297.3	0.67
25:00	14.34	182 ml/min	25.63	6146	999	6.68	-298.7	0.54
30:00	14.33	190 ml/min	26.93	6718	999	6.88	-306.7	0.46
35:00	14.34	184 ml/min	26.64	6674	999	6.87	-309.4	0.76
40:00	14.34	185 ml/min	25.67	6508	999	6.48	-291.6	0.41
45:00	14.34	184 ml/min	25.44	6463	999	6.45	-287.8	0.38
50:00	14.34	194 ml/min	25.36	6481	999	6.45	-286.7	0.35
55:00	14.35	194 ml/min	25.36	6319	999	6.52	-290.7	0.54
60:00	14.34	195 ml/min	25.20	6348	999	6.59	-294.3	0.31
65:00	14.35	198 ml/min	25.20	6337	999	6.61	-297.7	0.39
70:00								
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100:00								
105:00								
110:00								
115:00								
120:00								

sample

Sampling Time: 1222-1225

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-33D H-3 none N/A Midwest Environmental Lab

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Aug 8/16/07

Site Name: ~~MW-335~~ DAVIS-BESSE
Low-Flow Groundwater Sampling Form

Well ID: MW-335
Date: 8/16/07
Sampling Personnel: E. G. Murdock, M. J. Rosta, A. Percival
Weather Conditions: sunny, 86°F, SW wind 8mph
Time: 1:45 @ 1:46
File Name: DB335
Total Depth (I.D.): 42.25' Center Screen Length: 32'
Depth to Water (D.T.W.): (1) 13.69' Well Diameter: 3"
Total Volume Purged: 5.0 gal Casing Type: PVC
Purge Rate: 192 ml/min Sampling Device: peristaltic pump
Tubing Type: polyethylene Measuring Point: top of PVC pipe
Pump Intake (ft below M.P.): 32' color: clear odor: None

6

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 0.3% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	13.72'	194 ml/min	25.68	2650	2.69	7.16	-141.8	2.41
5:00	13.72'	195 ml/min	25.62	2651	2.98	7.16	-152.4	2.76
10:00	13.74'	220 ml/min	25.54	2644	3.06	7.16	-151.3	2.43
15:00	13.73'	208 ml/min	25.46	2616	2.53	7.16	-139.4	2.82
20:00	13.73'	192 ml/min	25.46	2600	2.76	7.16	-133.4	2.17
25:00	13.72'	195 ml/min	25.38	2592	3.42	7.16	-136.7	1.08
30:00	13.73'	200 ml/min	25.32	2586	10.58	7.16	-138.9	2.27
35:00	13.72'	196 ml/min	25.34	2579	12.17	7.16	-134.7	2.03
40:00	13.72'	205 ml/min	25.36	2569	11.17	7.16	-135.6	2.43
45:00	13.72'	205 ml/min	25.31	2555	16.0	7.16	-133.1	1.69
50:00	13.73'	204 ml/min	25.39	2547	17.78	7.17	-130.4	
55:00	13.74'	230 ml/min	25.08	2530	13.55	7.17	-102.5	1.40
60:00	13.74'	234 ml/min	25.28	2566	14.65	7.17	-90.8	0.90
65:00	13.73'	196 ml/min	25.65	2561	15.63	7.17	-110.2	0.60
70:00	13.73'	176 ml/min	25.54	2561	16.04	7.17	-99.5	0.85
75:00	13.73'	176 ml/min	25.51	2557	16.60	7.17	-92.5	0.39
80:00	13.73'	172 ml/min	25.53	2554	17.01	7.17	-95.8	0.66
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

restart after cleaning probes / recal.

→ stopped sampling

sample *

Sampling Time: 1447-1450

Samples Collected: MW-335 Analysis Requested: tritium Preservative: none Holding Time: N/A Lab: MIDWEST ENVIRONMENTAL LAB, INC.

* Experienced difficulty w/ D.O. analysis; values increasing unrealistically high, compared to last sample taken at this location. Based on all other parameters being stable, obtained sample @ 1450 hrs. AMP 8/16/07

Notes:
(1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
(2) - Stabilization criteria based on three most recent consecutive measurements.
(3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
(4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis - Besse N.F.S.
 Low-Flow Groundwater Sampling Form

Well ID: MW-34S
 Date: 8/2/07
 Sampling Personnel: E. Murricks, M. Rosta, A. Percival *
 Weather Conditions: hot sunny, 87°F, winds SW 5 mph
 Time: 1418 ~~1325~~
 File Name: DB-34S

Total Depth (I.D.): 42.85' Center Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.33' Well Diameter: 3"
 Total Volume Purged: 39 gallons Casing Type: PVC
 Purge Rate: 180 ml/min. Sampling Device: peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC pipe
 Pump Intake (ft below M.P.): 32' color: clear odor: none

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NIU)
Stabilization Criteria ²	(see note below) ³		+/- 0.3% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	15.07	178 ml/min	25.44	2652	999	7.13	-93.2	0.54
5:00	15.12	182 ml/min	25.31	2661	999	7.13	-92.7	0.53
10:00	15.21	194 ml/min	25.28	2654	999	7.13	-91.2	0.56
15:00	15.23	202 ml/min	25.18	2656	999	7.13	-90.5	0.57
20:00	15.27	206 ml/min	25.06	2647	999	7.13	-92.1	0.36
25:00	15.27	206 ml/min	24.97	2632	999	7.14	-100.9	0.29
30:00	15.28	212 ml/min	24.97	2621	999	7.14	-107.4	0.29
35:00	15.28	212 ml/min	24.96	2618	999	7.14	-109.0	0.167
40:00	15.29	210 ml/min	25.10	2594	999	7.14	-121.8	0.30
45:00	15.14	152 ml/min	25.46	2592	999	7.15	-123.2	0.19
50:00	15.09	150 ml/min	25.58	2589	999	7.15	-125.3	0.36
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

6

sample

Sampling Time: 1416-1418
 Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-34S H-3 none N/A Environmental, Inc. Midwest Lab

* D.O. probe working well in tap/demin water. Shortly after sample was filled D.O. value went to 999.9 and stayed there. Sample taken after all other readings steady. AW

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTU.

Site Name: DAVIS-BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-34D
 Date: 8/2/07
 Sampling Personnel: E. Murdock, M. J. Rosta, A. Percival
 Weather Conditions: hot sunny/overcast/rain/sun/80°F, NW winds
 Time: 1515H
 File Name: DB34D

Total Depth (I.D.): 80.78' Center Screen Length: 70'
 Depth to Water (D.T.W.): 14.16' Well Diameter: 3"
 Total Volume Purged: 2.5 gal. Casing Type: PVC
 Purge Rate: 190 ml/min Sampling Device: peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC pipe
 Pump Intake (ft below M.P.): 170' color: clear odor: strong sulfur

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below)		+/- 0.3% ³	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.45	178 ml/min	23.22	10420	999	7.04	-326.1	0.16
5:00	14.38	162 ml/min	23.84	10417	999	7.02	-326.2	0.15
10:00	14.38	188 ml/min	24.14	10293	999	7.01	-327.0	0.15
15:00	14.37	174 ml/min	24.25	10489	999	6.99	-328.5	0.16
20:00	14.35	178 ml/min	24.36	11167	999	6.97	-332.8	0.47
25:00	14.37	180 ml/min	24.29	11435	999	6.96	-333.1	0.92
30:00	14.36	182 ml/min	24.23	11261	999	6.97	-333.3	0.24
35:00	14.36	178 ml/min	24.25	11254	999	6.97	-332.8	0.16
40:00	14.35	186 ml/min	24.15	11031	999	6.96	-316.7	0.40
45:00								
50:00								
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

76
103

sample

Sampling Time: 1558H - 1558

Samples Collected: MW-34D Analysis Requested: fractum Preservative: none Holding Time: N/A Lab: Environmental, Inc. Midwest Lab

Notes
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSIE
 Low-Flow Groundwater Sampling Form

Well ID: 375
 Date: 8/31/07
 Sampling Personnel: B G MURDOCK, M J COSTA
 Weather Conditions: ✓ HOT 90°F MOSTLY SUNNY
 Time: 1335
 File Name: DB375

Total Depth (I.D.): 42.71' CASING Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 13.45' Well Diameter: 3"
 Total Volume Purged: 2.0 gal Casing Type: PVC
 Purge Rate: 202 ml/min Sampling Device: PERISTALTIC PUMP
 Tubing Type: polyethylene Measuring Point: TOP OF PVC PIPE
 Pump Intake (ft below M.P.): 32' color: ORANGE odor: NO ODOR

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 0.3% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	13.42'	200ml/min	18.70	2637	999	7.41	-136.8	29.99
5:00	13.43	198ml/min	17.80	2531	999	7.36	-127.8	29.99
10:00	13.43	202ml/min	17.21	2493	999	7.35	-131.3	29.99
15:00	13.43	204ml/min	17.28	2479	999	7.37	-131.8	29.99
20:00	13.44	204ml/min	17.39	2480	999	7.34	-137.6	9.68
25:00	13.43	206ml/min	17.65	2477	999	7.39	-133.6	5.62
30:00								
35:00								
40:00								
45:00								
50:00								
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

B

Sample

Sampling Time: 1402-1405
 Samples Collected: MW-375 Analysis Requested: TRITIUM Preservative: NONE Holding Time: N/A Lab: ENVIRONMENTAL INC MIDWEST LAB

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) - +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis - Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW-37D
 Date: 8/6/07
 Sampling Personnel: E. G. Mardock, M. J. Kosta, A. M. Percival
 Weather Conditions: Hazy, humid, 84°F, slight SW breeze (21 mph)
 Time: 11:05 AM 0908
 File Name: DB 37D

Total Depth (I.D.): 80.68' Screen Length: 70'
 Depth to Water (D.T.W.): ⁽¹⁾ 15.49' Well Diameter: 3"
 Total Volume Purged: 4.31 Casing Type: PVC
 Purge Rate: 145' Sampling Device: peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC
 Pump Intake (ft below M.P.): 70' color: gray to clear odor: sulfur odor

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 0.5% ⁴	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00		146 ml/min	19.55	94,320	0.23	6.68	-231.2	79.99
5:00	19.61	142 ml/min	20.09	93,320	0.17	6.69	-241.7	79.99
10:00	20.10	150 ml/min	19.87	94,993	0.14	6.72	-245.5	7.75
15:00	20.36	160 ml/min	19.97	95,310	0.14	6.72	-249.0	7.75
20:00	20.91	156 ml/min	19.82	96,610	0.12	6.74	-251.6	6.83
21:25	20.20	160 ml/min	19.72	98,586	0.11	6.69	-253.6	5.54
30:00	21.36	160 ml/min	19.62	100,600	0.11	6.73	-254.9	8.04
35:00	21.71	164 ml/min	19.30	98,000	0.11	6.73	-257.7	5.12
40:00	21.99	146 ml/min	19.13	101,300	0.08	6.73	-256.3	3.50
45:00	21.85	145 ml/min	19.17	107,200	0.08	6.69	-257.7	3.91
50:00	22.13	144 ml/min	19.39	105,900	0.08	6.70	-257.7	7.16
55:00	22.33	136 ml/min	19.49	107,200	0.08	6.70	-256.9	7.94
60:00	22.46	129 ml/min	19.36	110,200	0.08	6.75	-256.0	4.95
65:00	22.60	130 ml/min	19.38	111,100	0.08	6.71	-255.3	6.71
70:00	22.64	126 ml/min	19.77	113,200	0.08	6.71	-255.5	3.22
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1105-1108

Samples Collected: MW-37D Analysis Requested: toxic Preservative: none Holding Time: N/A Lab: Environmental, Inc. Midwest Lab

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.



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APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Environmental Inc., Midwest Laboratory participates in intercomparison studies administered by Environmental Resources Associates, and serves as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. Results are reported in Appendix A. TLD Intercomparison results, in-house spikes, blanks, duplicates and mixed analyte performance evaluation program results are also reported. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only.

October, 2006 through September, 2007

Appendix A

Interlaboratory Comparison Program Results

Environmental, Inc., Midwest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of its quality control program in December 1971. These programs are operated by agencies which supply environmental type samples containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on a laboratory's analytical procedures and to alert it of any possible problems.

Participant laboratories measure the concentration of specified radionuclides and report them to the issuing agency. Several months later, the agency reports the known values to the participant laboratories and specifies control limits. Results consistently higher or lower than the known values or outside the control limits indicate a need to check the instruments or procedures used.

Results in Table A-1 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.

The results in Table A-2 list results for thermoluminescent dosimeters (TLDs), via International Intercomparison of Environmental Dosimeters, when available, and internal laboratory testing.

~~Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years available upon request.~~

Table A-4 lists results of the analyses on in-house "blank" samples for the past twelve months. Data for previous years available upon request.

Table A-5 list results of the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Data for previous years available upon request.

The results in Table A-6 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

Results in Table A-7 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurement Laboratory Quality Assessment Program (EML).

Attachment A lists acceptance criteria for "spiked" samples.

Out-of-limit results are explained directly below the result.

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES^a

<u>Analysis</u>	<u>Level</u>	<u>One standard deviation for single determination</u>
Gamma Emitters	5 to 100 pCi/liter or kg > 100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89 ^b	5 to 50 pCi/liter or kg > 50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90 ^b	2 to 30 pCi/liter or kg > 30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	≥ 0.1 g/liter or kg	5% of known value
Gross alpha	≤ 20 pCi/liter > 20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	≤ 100 pCi/liter > 100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	≤ 4,000 pCi/liter > 4,000 pCi/liter	± 1σ = (pCi/liter) = 169.85 x (known) ^{0.0933} 10% of known value
Radium-226,-228	≥ 0.1 pCi/liter	15% of known value
Plutonium	≥ 0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129 ^b	≤ 55 pCi/liter > 55 pCi/liter	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-63 ^b Technetium-99 ^b	≤ 35 pCi/liter > 35 pCi/liter	6.0 pCi/liter 15% of known value
Iron-55 ^b	50 to 100 pCi/liter > 100 pCi/liter	10 pCi/liter 10% of known value
Others ^b	—	20% of known value

^a From EPA publication, "Environmental Radioactivity Laboratory Intercomparison Studies Program, Fiscal Year, 1981-1982, EPA-600/4-81-004.

^b Laboratory limit.

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)^a.

Lab Code	Date	Analysis	Concentration (pCi/L)			Acceptance
			Laboratory Result ^b	ERA Result ^c	Control Limits	
STW-1104	10/06/06	Sr-89	38.4 ± 1.3	39.9	31.2 - 45.7	Pass
STW-1104	10/06/06	Sr-90	15.5 ± 0.5	16.0	7.3 - 24.7	Pass
STW-1105	10/06/06	Ba-133	64.9 ± 2.8	70.2	58.1 - 82.3	Pass
STW-1105	10/06/06	Co-60	61.6 ± 1.0	62.3	53.6 - 71.0	Pass
STW-1105	10/06/06	Cs-134	29.0 ± 0.9	29.9	21.2 - 38.6	Pass
STW-1105	10/06/06	Cs-137	77.8 ± 2.4	78.2	69.5 - 86.9	Pass
STW-1105	10/06/06	Zn-65	293.0 ± 2.4	277.0	229.0 - 325.0	Pass
STW-1106	10/06/06	Gr. Alpha	23.9 ± 2.5	28.7	16.3 - 41.1	Pass
STW-1106	10/06/06	Gr. Beta	23.7 ± 1.4	20.9	12.2 - 29.6	Pass
STW-1107 ^d	10/06/06	I-131	28.4 ± 1.2	22.1	16.9 - 27.3	Fail
STW-1108	10/06/06	Ra-226	14.5 ± 0.5	14.4	10.7 - 18.1	Pass
STW-1108	10/06/06	Ra-228	6.6 ± 0.4	5.9	3.3 - 8.4	Pass
STW-1108	10/06/06	Uranium	2.9 ± 0.1	3.2	0.0 - 8.4	Pass
STW-1109	10/06/06	H-3	3000.0 ± 142.0	3050.0	2430.0 - 3670.0	Pass
STW-1121	04/09/07	Sr-89	30.7 ± 4.3	35.4	26.7 - 44.1	Pass
STW-1121	04/09/07	Sr-90	39.3 ± 1.8	42.1	33.4 - 50.8	Pass
STW-1122	04/09/07	Ba-133	30.0 ± 2.4	29.3	20.6 - 38.0	Pass
STW-1122	04/09/07	Co-60	118.5 ± 3.9	119.0	109.0 - 129.0	Pass
STW-1122	04/09/07	Cs-134	52.6 ± 2.3	54.3	45.6 - 63.0	Pass
STW-1122	04/09/07	Cs-137	49.5 ± 3.8	50.3	41.6 - 59.0	Pass
STW-1122	04/09/07	Zn-65	91.7 ± 6.3	88.6	73.3 - 104.0	Pass
STW-1123	04/09/07	Gr. Alpha	33.8 ± 3.5	56.5	32.0 - 81.0	Pass
STW-1123	04/09/07	Gr. Beta	24.2 ± 2.3	25.3	16.6 - 34.0	Pass
STW-1124	04/09/07	I-131	19.2 ± 1.2	18.9	13.7 - 24.1	Pass
STW-1125	04/09/07	H-3	7540.0 ± 255.0	8060.0	6660.0 - 9450.0	Pass
STW-1125	04/09/07	Ra-226	13.0 ± 0.6	13.4	9.9 - 16.9	Pass
STW-1125	04/09/07	Ra-228	19.9 ± 2.7	18.2	10.3 - 26.1	Pass
STW-1125	04/09/07	Uranium	4.5 ± 0.2	4.6	0.0 - 9.8	Pass
STW-1127	07/09/07	Sr-89	51.7 ± 5.0	58.2	49.5 - 66.9	Pass
STW-1127	07/09/07	Sr-90	21.4 ± 2.3	19.0	10.3 - 27.7	Pass
STW-1128	07/09/07	Ba-133	19.4 ± 2.2	19.4	10.7 - 28.1	Pass
STW-1128	07/09/07	Co-60	32.8 ± 2.0	33.5	24.8 - 42.2	Pass
STW-1128	07/09/07	Cs-134	67.0 ± 2.9	68.9	60.2 - 77.6	Pass
STW-1128	07/09/07	Cs-137	61.6 ± 3.8	61.3	52.6 - 70.0	Pass
STW-1128	07/09/07	Zn-65	55.6 ± 7.5	54.6	45.2 - 64.0	Pass
STW-1129	07/09/07	Gr. Alpha	19.2 ± 1.6	27.1	15.4 - 38.8	Pass
STW-1129	07/09/07	Gr. Beta	9.1 ± 0.9	11.5	2.8 - 20.2	Pass
STW-1130	07/09/07	Ra-226	7.0 ± 0.5	7.7	5.7 - 9.7	Pass
STW-1130	07/09/07	Ra-228	9.2 ± 2.3	9.1	5.2 - 13.1	Pass
STW-1130	07/09/07	Uranium	23.9 ± 1.1	25.1	19.9 - 30.3	Pass

^a Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

^b Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

^c Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

^d The reported result was an average of three analyses, results ranged from 25.36 to 29.23 pCi/L. A fourth analysis was performed, result of analysis, 24.89 pCi/L.

TABLE A-2. Crosscheck program results; Thermoluminescent Dosimetry, (TLD, CaSO₄: Dy Cards).

Lab Code	Date	Description	Known Value	mR		Control Limits	Acceptance
				Lab Result	± 2 sigma		
<u>Environmental, Inc.</u>							
2006-2	11/6/2006	30 cm.	55.61	60.79 ± 1.32		38.93 - 72.29	Pass
2006-2	11/6/2006	40 cm.	31.28	35.93 ± 3.70		21.90 - 40.66	Pass
2006-2	11/6/2006	50 cm.	20.02	21.55 ± 1.20		14.01 - 26.03	Pass
2006-2	11/6/2006	60 cm.	13.90	14.90 ± 1.42		9.73 - 18.07	Pass
2006-2	11/6/2006	75 cm.	8.90	8.03 ± 0.51		6.23 - 11.57	Pass
2006-2	11/6/2006	90 cm.	6.18	6.88 ± 0.68		4.33 - 8.03	Pass
2006-2	11/6/2006	120 cm.	3.48	2.90 ± 0.20		2.44 - 4.52	Pass
2006-2	11/6/2006	150 cm.	2.22	1.99 ± 0.07		1.55 - 2.89	Pass
2006-2	11/6/2006	180 cm.	1.54	1.79 ± 0.94		1.08 - 2.00	Pass
<u>Environmental, Inc.</u>							
2007-1	7/13/2007	30 cm.	54.25	60.56 ± 5.54		37.98 - 70.53	Pass
2007-1	7/13/2007	40 cm.	30.51	34.23 ± 0.96		21.36 - 39.66	Pass
2007-1	7/13/2007	50 cm.	19.53	17.95 ± 1.86		13.67 - 25.39	Pass
2007-1	7/13/2007	60 cm.	13.56	16.61 ± 0.60		9.49 - 17.63	Pass
2007-1	7/13/2007	70 cm.	9.96	9.72 ± 0.90		6.97 - 12.95	Pass
2007-1	7/13/2007	80 cm.	7.63	7.79 ± 0.33		5.34 - 9.92	Pass
2007-1	7/13/2007	90 cm.	6.03	5.53 ± 0.72		4.22 - 7.84	Pass
2007-1	7/13/2007	100 cm.	4.88	5.32 ± 0.17		3.42 - 6.34	Pass
2007-1	7/13/2007	110 cm.	4.03	3.49 ± 0.14		2.82 - 5.24	Pass
2007-1	7/13/2007	120 cm.	3.39	2.64 ± 0.14		2.37 - 4.41	Pass
2007-1	7/13/2007	150 cm.	2.17	2.13 ± 0.87		1.52 - 2.82	Pass

TABLE A-3. In-House "Spike" Samples

Lab Code ^b	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			Laboratory results 2s, n=1 ^c	Known Activity	Control Limits ^d	
W-120106	12/1/2006	Gr. Alpha	22.40 ± 1.03	20.08	10.04 - 30.12	Pass
W-120106	12/1/2006	Gr. Beta	63.70 ± 1.14	65.73	55.73 - 75.73	Pass
SPAP-9476	12/29/2006	Gr. Beta	57.51 ± 0.14	53.16	42.53 - 74.42	Pass
SPAP-9478	12/29/2006	Cs-134	26.84 ± 1.23	30.06	20.06 - 40.06	Pass
SPAP-9478	12/29/2006	Cs-137	110.54 ± 3.12	117.10	105.39 - 128.81	Pass
SPW-9480	12/29/2006	H-3	68972.20 ± 748.00	72051.60	57641.28 - 86461.92	Pass
SPW-9483	12/29/2006	Tc-99	29.43 ± 0.84	32.98	20.98 - 44.98	Pass
SPW-9486	12/29/2006	Fe-55	17168.00 ± 410.00	19712.50	15770.00 - 23655.00	Pass
SPW-9488	12/29/2006	Cs-134	61.35 ± 1.65	60.10	50.10 - 70.10	Pass
SPW-9488	12/29/2006	Cs-137	60.30 ± 2.76	56.80	46.80 - 66.80	Pass
SPMI-9490	12/29/2006	Cs-134	58.99 ± 5.43	60.10	50.10 - 70.10	Pass
SPMI-9490	12/29/2006	Cs-137	54.16 ± 7.85	56.80	46.80 - 66.80	Pass
SPF-9492	12/29/2006	Cs-134	0.64 ± 0.01	0.60	0.36 - 0.84	Pass
SPF-9492	12/29/2006	Cs-137	2.61 ± 0.03	2.34	1.40 - 3.28	Pass
W-30707	3/7/2007	Gr. Alpha	19.51 ± 0.40	20.08	10.04 - 30.12	Pass
W-30707	3/7/2007	Gr. Beta	67.45 ± 0.49	65.73	55.73 - 75.73	Pass
SPAP-1566	3/23/2007	Cs-134	25.35 ± 1.31	27.82	17.82 - 37.82	Pass
SPAP-1566	3/23/2007	Cs-137	107.52 ± 3.02	116.48	104.83 - 128.13	Pass
SPW-1568	3/23/2007	H-3	65595.00 ± 672.00	71118.00	56894.40 - 85341.60	Pass
SPW-1678	3/28/2007	Tc-99	28.44 ± 1.12	32.35	20.35 - 44.35	Pass
SPW-1595	4/5/2007	Cs-134	54.48 ± 2.12	54.99	44.99 - 64.99	Pass
SPW-1595	4/5/2007	Cs-137	59.03 ± 2.94	58.19	48.19 - 68.19	Pass
SPW-1595	4/5/2007	I-131(G)	83.11 ± 3.51	82.07	72.07 - 92.07	Pass
SPW-1595A	4/5/2007	I-131	78.40 ± 1.10	82.07	65.66 - 98.48	Pass
SPW-1595B	4/5/2007	I-131	78.97 ± 1.10	82.07	65.66 - 98.48	Pass
SPMI-1597	4/5/2007	Cs-134	54.03 ± 2.15	54.99	44.99 - 64.99	Pass
SPMI-1597	4/5/2007	Cs-137	59.81 ± 4.75	58.19	48.19 - 68.19	Pass
SPMI-1597	4/5/2007	I-131(G)	83.97 ± 4.07	82.07	72.07 - 92.07	Pass
SPMI-1597A	4/5/2007	I-131	79.53 ± 1.03	82.07	65.66 - 98.48	Pass
SPMI-1597B	4/5/2007	I-131	83.51 ± 1.05	82.07	65.66 - 98.48	Pass
SPCH-2839	5/17/2007	I-131(G)	78.70 ± 7.36	70.40	60.40 - 80.40	Pass
SPW-2847	5/17/2007	Cs-134	55.43 ± 1.68	52.85	42.85 - 62.85	Pass
SPW-2847	5/17/2007	Cs-137	59.86 ± 2.71	58.03	48.03 - 68.03	Pass
SPW-2847	5/17/2007	I-131(G)	63.95 ± 2.69	70.87	60.87 - 80.87	Pass
SPMI-2849	5/17/2007	Cs-134	51.37 ± 1.65	52.85	42.85 - 62.85	Pass
SPMI-2849	5/17/2007	Cs-137	60.42 ± 4.31	58.03	48.03 - 68.03	Pass
SPMI-2849	5/17/2007	I-131(G)	62.44 ± 3.14	70.87	60.87 - 80.87	Pass
SPCH-2922	5/17/2007	I-131(G)	80.00 ± 6.40	70.40	41.60 - 99.20	Pass
SPW-2847	5/18/2007	I-131	60.14 ± 0.89	70.87	56.70 - 85.04	Pass
SPW-2847	5/18/2007	Sr-89	104.93 ± 6.64	121.90	97.52 - 146.28	Pass
SPW-2847	5/18/2007	Sr-89	46.72 ± 1.97	46.08	36.08 - 56.08	Pass
SPMI-2849	5/18/2007	I-131	67.97 ± 0.88	70.87	56.70 - 85.04	Pass

TABLE A-4: In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis ^b	Concentration (pCi/L) ^a		
				Laboratory results (4.66σ)		Acceptance Criteria (4.66 σ)
				LLD	Activity ^c	
W-120106	water	12/1/2006	Gr. Alpha	0.11	0.066 ± 0.072	1
W-120106	water	12/1/2006	Gr. Beta	0.30	0.093 ± 0.16	3.2
SPAP-9477	Air Filter	12/29/2006	Gr. Beta	1.13	-0.37 ± 0.66	3.2
SPAP-9479	Air Filter	12/29/2006	Cs-137	0.87		100
SPW-9481	water	12/29/2006	H-3	146.2	63.2 ± 80.1	200
SPW-9483	water	12/29/2006	Tc-99	0.95	-1.20 ± 0.56	10
SPW-9489	water	12/29/2006	Cs-134	2.30		10
SPMI-9491	Milk	12/29/2006	Cs-134	3.10		10
SPMI-9491	Milk	12/29/2006	Cs-137	2.90		10
SPMI-9491	Milk	12/29/2006	I-131(G)	8.00		20
SPF-9493	Fish	12/29/2006	Cs-134	7.6		100
SPF-9493	Fish	12/29/2006	Cs-137	7.9		100
W-30707	water	3/7/2007	Gr. Alpha	0.04	0.00 ± 0.03	1
W-30707	water	3/7/2007	Gr. Beta	0.08	0.01 ± 0.05	3.2
SPAP-1567	Air Filter	3/23/2007	Cs-134	0.79		100
SPW-1567	Air Filter	3/23/2007	Cs-137	1.01		100
SPW-1568	water	3/23/2007	H-3	176.10	-26.16 ± 91.62	200
SPW-1596	water	4/5/2007	Cs-134	3.28		10
SPW-1596	water	4/5/2007	Cs-137	3.45		10
SPW-1596	water	4/5/2007	I-131	0.27	0.02 ± 0.18	0.5
SPW-1596	water	4/5/2007	I-131(G)	2.91		20
SPMI-1598	Milk	4/5/2007	Cs-134	3.30		10
SPMI-1598	Milk	4/5/2007	Cs-137	5.08		10
SPMI-1598	Milk	4/5/2007	I-131	0.26	-0.10 ± 0.17	0.5
SPMI-1598	Milk	4/5/2007	I-131(G)	4.10		20
SPCH-2839	Charcoal Canister	5/17/2007	I-131(G)	2.24		9.6
SPW-2848	water	5/17/2007	Cs-134	3.14		10
SPW-2848	water	5/17/2007	Cs-137	1.37		10
SPW-2848	water	5/17/2007	I-131(G)	5.34		20
SPMI-2850	Milk	5/17/2007	Cs-134	3.32		10
SPMI-2850	Milk	5/17/2007	Cs-137	2.60		10
SPMI-2850	Milk	5/17/2007	I-131(G)	4.77		20
SPW-2848	water	5/18/2007	I-131	0.34	-0.06 ± 0.19	0.5
SPW-2848	water	5/18/2007	Sr-89	0.81	-0.02 ± 0.65	5
SPW-2848	water	5/18/2007	Sr-90	0.53	0.01 ± 0.25	1
SPMI-2850	Milk	5/18/2007	I-131	0.45	0.20 ± 0.26	0.5
SPMI-2850	Milk	5/18/2007	Sr-89	0.96	-0.73 ± 1.02	5
SPMI-2850 ^d	Milk	5/18/2007	Sr-90	0.58	0.96 ± 0.38	1

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis ^b	Concentration (pCi/L) ^a		
				Laboratory results (4.66σ)		Acceptance Criteria (4.66 σ)
				LLD	Activity ^c	
SPAP-2914	Air Filter	5/22/2007	Gr. Beta	0.004	-0.002 ± 0.002	3.2
SPAP-2916	Air Filter	5/22/2007	Cs-134	2.84		100
SPAP-2916	Air Filter	5/22/2007	Cs-137	2.24		100
SPF-2923	Fish	5/22/2007	Cs-134	8.71		100
SPF-2923	Fish	5/22/2007	Cs-137	8.35		100
SPW-3224	water	5/24/2007	Ni-63	1.61	-0.30 ± 0.84	20
W-60507	water	6/5/2007	Gr. Alpha	0.04	0.00 ± 0.03	1
W-60507	water	6/5/2007	Gr. Beta	0.08	0.00 ± 0.05	3.2
SPW-4328	water	7/18/2007	Tc-99	6.41	-3.12 ± 3.84	10
SPW-5477	water	8/17/2007	Ni-63	0.00	4.38 ± 1.01	20
W-92107	water	9/21/2007	Gr. Alpha	0.04	0.01 ± 0.03	1
W-92107	water	9/21/2007	Gr. Beta	0.08	-0.03 ± 0.05	3.2

^a Liquid sample results are reported in pCi/Liter, air filters(pCi/filter), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).

^b I-131(G); iodine-131 as analyzed by gamma spectroscopy.

^c Activity reported is a net activity result. For gamma spectroscopic analysis, activity detected below the LLD value is not reported.

^d Low levels of Sr-90 are still detected in the environment. A concentration of (1-5 pCi/L) in milk is not unusual.

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
MI-6760, 6761	10/2/2006	K-40	1413.10 ± 113.20	1187.30 ± 155.20	1300.20 ± 96.05	Pass
G-6797, 6798	10/2/2006	Be-7	4.70 ± 0.31	4.56 ± 0.41	4.63 ± 0.26	Pass
G-6797, 6798	10/2/2006	Gr. Beta	6.89 ± 0.26	7.04 ± 0.24	6.97 ± 0.18	Pass
G-6797, 6798 ^b	10/2/2006	K-40	5.39 ± 0.35	4.36 ± 0.47	4.88 ± 0.29	Fail
AP-7531, 7532	10/3/2006	Be-7	0.07 ± 0.01	0.08 ± 0.01	0.08 ± 0.01	Pass
AP-7552, 7553	10/3/2006	Be-7	0.08 ± 0.02	0.08 ± 0.01	0.08 ± 0.01	Pass
AP-7573, 7574	10/3/2006	Be-7	0.08 ± 0.02	0.08 ± 0.01	0.08 ± 0.01	Pass
SO-7103, 7104	10/4/2006	Cs-137	0.25 ± 0.05	0.27 ± 0.06	0.26 ± 0.04	Pass
SO-7103, 7104	10/4/2006	K-40	12.95 ± 1.12	12.22 ± 1.07	12.58 ± 0.77	Pass
DW-60759, 60760	10/5/2006	Gr. Alpha	4.93 ± 0.97	5.04 ± 1.03	4.99 ± 0.71	Pass
MI-7037, 7038	10/10/2006	K-40	1326.10 ± 115.20	1251.40 ± 115.70	1288.75 ± 81.64	Pass
VE-7058, 7059	10/10/2006	Gr. Alpha	0.18 ± 0.11	0.32 ± 0.14	0.25 ± 0.09	Pass
VE-7058, 7059	10/10/2006	Gr. Beta	9.21 ± 0.34	8.83 ± 0.36	9.02 ± 0.25	Pass
VE-7058, 7059	10/10/2006	K-40	10.90 ± 0.65	10.42 ± 0.80	10.66 ± 0.52	Pass
SS-7079, 7080	10/10/2006	Cs-137	0.04 ± 0.01	0.04 ± 0.02	0.04 ± 0.01	Pass
SS-7079, 7080	10/10/2006	Gr. Beta	12.23 ± 2.46	11.76 ± 2.23	11.99 ± 1.66	Pass
SS-7079, 7080	10/10/2006	K-40	7.23 ± 0.36	7.37 ± 0.40	7.30 ± 0.27	Pass
MI-7208, 7209	10/11/2006	K-40	1295.20 ± 116.90	1386.90 ± 119.10	1341.05 ± 83.44	Pass
DW-60809, 60810	10/16/2006	Gr. Alpha	1.44 ± 1.06	1.65 ± 1.19	1.54 ± 0.80	Pass
DW-60797, 60798	10/17/2006	Gr. Alpha	0.84 ± 0.70	1.03 ± 0.67	0.94 ± 0.48	Pass
DW-60797, 60798	10/17/2006	Gr. Beta	0.86 ± 0.56	1.33 ± 0.60	1.10 ± 0.41	Pass
CF-7450, 7451	10/18/2006	K-40	20.40 ± 0.84	19.54 ± 0.99	19.97 ± 0.65	Pass
LW-7945, 7946	10/26/2006	Gr. Beta	1.30 ± 0.37	1.44 ± 0.36	1.37 ± 0.26	Pass
F-7971, 7972	10/29/2006	K-40	3.63 ± 0.54	3.33 ± 0.43	3.48 ± 0.34	Pass
SWU-8194, 8195	10/31/2006	Gr. Beta	1.84 ± 0.28	1.43 ± 0.28	1.64 ± 0.20	Pass
BS-8017, 8018	11/1/2006	Gr. Beta	10.54 ± 1.72	10.17 ± 1.73	10.36 ± 1.22	Pass
BS-8017, 8018	11/1/2006	K-40	10.00 ± 0.53	9.60 ± 0.69	9.80 ± 0.44	Pass
TD-8173, 8174	11/1/2006	H-3	580.00 ± 110.00	599.00 ± 110.00	589.50 ± 77.78	Pass
LW-8215, 8216	11/1/2006	Gr. Beta	2.23 ± 0.61	1.64 ± 0.37	1.93 ± 0.35	Pass
F-8345, 8346	11/2/2006	K-40	2.84 ± 0.42	2.89 ± 0.40	2.86 ± 0.29	Pass
BS-8366, 8367	11/2/2006	K-40	13.69 ± 0.66	13.61 ± 0.78	13.65 ± 0.51	Pass
MI-8083, 8084	11/6/2006	K-40	1295.00 ± 121.20	1374.80 ± 162.80	1334.90 ± 101.48	Pass
WW-8259, 8260	11/7/2006	H-3	337.00 ± 95.00	295.00 ± 93.00	316.00 ± 66.47	Pass
VE-8149, 8150	11/8/2006	Be-7	1.26 ± 0.24	1.25 ± 0.22	1.26 ± 0.16	Pass
VE-8149, 8150	11/8/2006	K-40	4.17 ± 0.47	4.49 ± 0.45	4.33 ± 0.33	Pass
DW-60877, 60878	11/14/2006	Gr. Alpha	48.03 ± 5.32	47.26 ± 6.77	47.65 ± 4.31	Pass
DW-60990, 60991	11/20/2006	Gr. Alpha	6.70 ± 2.03	3.41 ± 1.34	5.06 ± 1.22	Pass
MI-8484, 8485	11/22/2006	K-40	1405.80 ± 87.06	1390.70 ± 103.60	1398.25 ± 67.66	Pass
DW-60925, 60926	11/22/2006	Gr. Alpha	3.87 ± 1.13	3.04 ± 0.99	3.46 ± 0.75	Pass
SO-8619, 8620	11/27/2006	Cs-137	0.74 ± 0.08	0.69 ± 0.06	0.71 ± 0.05	Pass
SO-8619, 8620	11/27/2006	Gr. Alpha	16.54 ± 5.65	12.24 ± 4.90	14.39 ± 3.74	Pass
SO-8619, 8620	11/27/2006	Gr. Beta	24.99 ± 3.88	28.66 ± 3.95	26.82 ± 2.77	Pass
SO-8619, 8620	11/27/2006	K-40	12.21 ± 1.11	12.92 ± 0.83	12.57 ± 0.69	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
DW-60902, 60903	11/28/2006	Gr. Alpha	5.06 ± 1.10	3.70 ± 1.05	4.38 ± 0.76	Pass
SWT-8641, 8642	11/29/2006	Gr. Beta	2.83 ± 0.47	2.89 ± 0.45	2.86 ± 0.33	Pass
DW-60937, 60938	11/30/2006	Gr. Alpha	2.65 ± 0.92	1.59 ± 0.88	2.12 ± 0.64	Pass
S-3437, 3438	12/6/2006	Gr. Alpha	1.77 ± 0.90	2.33 ± 0.90	2.05 ± 0.64	Pass
S-3437, 3438	12/6/2006	Gr. Beta	3.98 ± 1.10	3.21 ± 1.03	3.60 ± 0.76	Pass
S-3437, 3438	12/6/2006	K-40	2.83 ± 0.21	2.98 ± 0.22	2.91 ± 0.15	Pass
DW-8929, 8930	12/8/2006	I-131	0.58 ± 0.27	0.42 ± 0.26	0.50 ± 0.19	Pass
SWT-9436, 9437	12/26/2006	Gr. Beta	2.39 ± 0.64	2.25 ± 0.60	2.32 ± 0.44	Pass
E-20, 21	1/2/2007	Gr. Beta	1.76 ± 0.07	1.70 ± 0.06	1.73 ± 0.05	Pass
E-20, 21	1/2/2007	K-40	1.49 ± 0.24	1.57 ± 0.27	1.53 ± 0.18	Pass
CF-41, 42	1/2/2007	Gr. Beta	18.02 ± 0.41	18.81 ± 0.42	18.42 ± 0.29	Pass
CF-41, 42	1/2/2007	K-40	11.68 ± 1.12	12.67 ± 0.97	12.18 ± 0.74	Pass
CF-41, 42	1/2/2007	Sr-90	0.04 ± 0.01	0.03 ± 0.01	0.03 ± 0.01	Pass
P-9516, 9517	1/3/2007	H-3	270.78 ± 91.74	301.18 ± 92.99	285.98 ± 65.31	Pass
LW-9579, 9580	1/4/2007	Gr. Beta	0.91 ± 0.31	0.93 ± 0.30	0.92 ± 0.22	Pass
DW-70085, 70086	1/9/2007	Gr. Alpha	7.95 ± 1.20	7.92 ± 1.42	7.94 ± 0.93	Pass
DW-70037, 70038	1/11/2007	Gr. Alpha	55.47 ± 3.99	52.87 ± 4.02	54.17 ± 2.83	Pass
DW-70054, 70055	1/18/2007	Gr. Alpha	2.68 ± 0.88	1.88 ± 0.78	2.28 ± 0.59	Pass
DW-70122, 70123	1/18/2007	Gr. Alpha	4.30 ± 1.14	6.25 ± 1.16	5.28 ± 0.81	Pass
DW-70122, 70123	1/18/2007	Gr. Beta	4.22 ± 0.70	5.33 ± 0.75	4.78 ± 0.51	Pass
DW-70098, 70099	1/25/2007	Gr. Alpha	3.27 ± 0.90	1.97 ± 0.92	2.62 ± 0.64	Pass
DW-70110, 70111	1/25/2007	Gr. Alpha	2.19 ± 0.92	1.69 ± 0.79	1.94 ± 0.61	Pass
SWU-676, 677	1/30/2007	Gr. Beta	1.77 ± 0.39	2.11 ± 0.39	1.94 ± 0.28	Pass
DW-70148, 70149	1/30/2007	Gr. Alpha	4.65 ± 1.37	5.20 ± 1.81	4.93 ± 1.14	Pass
SW-600, 601	2/1/2007	K-40	1.24 ± 0.12	1.20 ± 0.12	1.22 ± 0.08	Pass
SW-601, 602	2/1/2007	Gr. Beta	0.89 ± 0.37	1.02 ± 0.25	0.96 ± 0.22	Pass
DW-1138, 1139	2/9/2007	H-3	2707.00 ± 161.00	2700.00 ± 161.00	2703.50 ± 113.84	Pass
MI-721, 722	2/13/2007	K-40	1330.40 ± 117.60	1316.40 ± 116.50	1323.40 ± 82.77	Pass
SW-847, 848	2/13/2007	Gr. Alpha	3.82 ± 1.67	2.61 ± 1.24	3.22 ± 1.04	Pass
SW-847, 848	2/13/2007	Gr. Beta	7.33 ± 1.37	5.89 ± 0.90	6.61 ± 0.82	Pass
DW-70175, 70176	2/14/2007	Gr. Alpha	11.72 ± 1.68	8.84 ± 1.32	10.28 ± 1.07	Pass
DW-70187, 70188	2/14/2007	Gr. Alpha	6.79 ± 1.18	6.47 ± 1.08	6.63 ± 0.80	Pass
SWU-1162, 1163	2/27/2007	Gr. Beta	3.63 ± 0.69	2.61 ± 0.44	3.12 ± 0.41	Pass
DW-70205, 70206	2/28/2007	Gr. Alpha	0.88 ± 0.80	1.31 ± 0.79	1.10 ± 0.56	Pass
PW-1117, 1118	3/1/2007	Gr. Alpha	3.79 ± 1.91	3.62 ± 2.09	3.71 ± 1.42	Pass
PW-1117, 1118	3/1/2007	Gr. Beta	7.12 ± 1.40	7.20 ± 1.39	7.16 ± 0.99	Pass
W-2122, 2123	3/5/2007	Gr. Alpha	6.10 ± 4.16	3.80 ± 4.30	4.95 ± 2.99	Pass
W-2122, 2123	3/5/2007	Gr. Beta	10.65 ± 2.15	13.11 ± 2.42	11.88 ± 1.62	Pass
W-2085, 2086	3/6/2007	Gr. Alpha	2.51 ± 2.29	1.10 ± 2.78	1.81 ± 1.80	Pass
W-2085, 2086	3/6/2007	Gr. Beta	11.02 ± 1.85	9.50 ± 2.01	10.26 ± 1.37	Pass
DW-70232, 70233	3/8/2007	Gr. Alpha	4.75 ± 1.28	5.98 ± 1.31	5.37 ± 0.92	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
WW-1477, 1478	3/12/2007	Gr. Beta	6.41 ± 1.48	4.10 ± 1.25	5.26 ± 0.97	Pass
WW-1498, 1499	3/15/2007	Gr. Beta	0.83 ± 0.31	0.97 ± 0.33	0.90 ± 0.22	Pass
W-2140, 2141	3/19/2007	Gr. Alpha	2.31 ± 1.57	1.33 ± 1.64	1.82 ± 1.14	Pass
W-2140, 2141	3/19/2007	Gr. Beta	4.26 ± 1.00	5.58 ± 1.02	4.92 ± 0.71	Pass
DW-1626, 1627	3/21/2007	H-3	4973.00 ± 209.00	5190.00 ± 213.00	5081.50 ± 149.21	Pass
MI-1647, 1648	3/21/2007	K-40	1448.80 ± 120.20	1439.30 ± 126.00	1444.05 ± 87.07	Pass
DW-70248, 70249	3/21/2007	Gr. Alpha	11.10 ± 1.18	9.90 ± 1.16	10.50 ± 0.83	Pass
W-2150, 2151	3/26/2007	Gr. Alpha	3.56 ± 2.20	3.30 ± 1.81	3.43 ± 1.42	Pass
W-2150, 2151	3/26/2007	Gr. Beta	9.26 ± 1.00	10.17 ± 1.90	9.72 ± 1.07	Pass
LW-1941, 1942	3/31/2007	Gr. Beta	1.35 ± 0.43	1.36 ± 0.41	1.36 ± 0.30	Pass
MI-1824, 1825	4/2/2007	K-40	1316.10 ± 110.60	1229.80 ± 110.50	1272.95 ± 78.17	Pass
MI-1824, 1825	4/2/2007	Sr-90	1.20 ± 0.50	1.10 ± 0.36	1.15 ± 0.31	Pass
AP-2170, 2171	4/2/2007	Be-7	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01	Pass
WW-1850, 1851	4/3/2007	H-3	-5.83 ± 102.29	150.05 ± 80.14	72.11 ± 64.97	Pass
AP-2198, 2199	4/3/2007	Be-7	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01	Pass
AP-2370, 2371	4/3/2007	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01	Pass
DW-70300, 70301	4/4/2007	Gr. Alpha	3.78 ± 0.89	3.66 ± 0.96	3.72 ± 0.65	Pass
DW-70300, 70301	4/4/2007	Gr. Beta	2.93 ± 0.61	2.91 ± 0.64	2.92 ± 0.44	Pass
DW-70335, 70336	4/5/2007	Gr. Alpha	24.37 ± 2.89	22.72 ± 2.91	23.55 ± 2.05	Pass
DW-70335, 70336	4/5/2007	Gr. Beta	20.26 ± 1.37	18.33 ± 1.34	19.30 ± 0.96	Pass
SW-1898, 1899	4/10/2007	Gr. Alpha	3.86 ± 1.40	4.78 ± 1.51	4.32 ± 1.03	Pass
SW-1898, 1899	4/10/2007	Gr. Beta	6.31 ± 1.36	7.03 ± 1.42	6.67 ± 0.98	Pass
SW-1898, 1899	4/10/2007	H-3	241.99 ± 93.35	318.10 ± 96.48	280.04 ± 67.12	Pass
DW-70346, 70347	4/11/2007	Gr. Alpha	1.83 ± 1.08	2.54 ± 1.04	2.19 ± 0.75	Pass
DW-70346, 70347	4/11/2007	Gr. Beta	4.62 ± 0.72	4.01 ± 0.71	4.32 ± 0.51	Pass
DW-70376, 70377	4/11/2007	Gr. Alpha	1.81 ± 0.80	1.66 ± 0.86	1.74 ± 0.59	Pass
DW-70376, 70377	4/11/2007	Gr. Beta	1.84 ± 0.62	2.24 ± 0.61	2.04 ± 0.44	Pass
DW-70311, 70312	4/12/2007	Gr. Alpha	10.82 ± 1.50	13.20 ± 1.56	12.01 ± 1.08	Pass
WW-2349, 2350	4/17/2007	Gr. Alpha	0.71 ± 0.56	0.62 ± 0.52	0.66 ± 0.38	Pass
WW-2461, 2462	4/25/2007	H-3	190.30 ± 100.31	115.95 ± 97.65	153.13 ± 70.00	Pass
LW-2437, 2438	4/26/2007	Gr. Beta	2.71 ± 0.50	2.15 ± 0.45	2.43 ± 0.34	Pass
LW-2917, 2918	4/30/2007	Gr. Beta	1.97 ± 0.79	2.78 ± 0.81	2.38 ± 0.57	Pass
SO-2583, 2584	5/1/2007	Be-7	544.99 ± 247.70	601.13 ± 192.20	573.06 ± 156.76	Pass
SO-2583, 2584	5/1/2007	Cs-137	119.22 ± 36.61	87.46 ± 23.97	103.34 ± 21.88	Pass
SO-2583, 2584	5/1/2007	K-40	17825.00 ± 749.90	17672.00 ± 724.30	17748.50 ± 521.29	Pass
SO-2583, 2584	5/1/2007	Gr. Alpha	11.49 ± 3.96	8.04 ± 3.88	9.77 ± 2.77	Pass
SO-2583, 2584	5/1/2007	Gr. Beta	31.02 ± 3.74	26.10 ± 3.40	28.56 ± 2.53	Pass
S-2620, 2621	5/2/2007	H-3	277.90 ± 126.70	304.40 ± 101.00	291.15 ± 81.02	Pass
MI-2610, 2611	5/3/2007	K-40	1549.20 ± 184.20	1388.80 ± 128.20	1469.00 ± 112.21	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
W-4469, 4470	5/7/2007	Gr. Beta	10.60 ± 1.90	11.10 ± 1.80	10.85 ± 1.31	Pass
SS-2697, 2698	5/8/2007	Cs-137	0.06 ± 0.02	0.05 ± 0.03	0.05 ± 0.02	Pass
SS-2697, 2698	5/8/2007	K-40	8.03 ± 0.57	7.36 ± 0.68	7.70 ± 0.44	Pass
MI-2790, 2791	5/14/2007	K-40	1694.30 ± 126.20	1627.60 ± 128.80	1660.95 ± 90.16	Pass
W-4505, 4506	5/14/2007	Gr. Beta	3.30 ± 1.70	3.90 ± 1.50	3.60 ± 1.13	Pass
DW-3219, 3220	5/26/2007	I-131	0.62 ± 0.32	0.69 ± 0.31	0.66 ± 0.22	Pass
SO-3416, 3417	5/31/2007	Cs-137	0.15 ± 0.03	0.15 ± 0.03	0.15 ± 0.02	Pass
SO-3416, 3417	5/31/2007	Gr. Beta	22.88 ± 2.33	22.46 ± 2.37	22.67 ± 1.66	Pass
SO-3416, 3417	5/31/2007	K-40	12.26 ± 0.80	12.36 ± 0.65	12.31 ± 0.52	Pass
F-3561, 3562	5/31/2007	K-40	3.06 ± 0.39	3.37 ± 0.45	3.21 ± 0.30	Pass
SL-3311, 3312	6/4/2007	Be-7	0.61 ± 0.29	0.55 ± 0.25	0.58 ± 0.19	Pass
SL-3311, 3312	6/4/2007	K-40	5.78 ± 0.67	4.87 ± 0.25	5.33 ± 0.36	Pass
SL-3992, 3993	6/4/2007	Be-7	0.75 ± 0.19	0.74 ± 0.32	0.75 ± 0.19	Pass
SL-3992, 3993	6/4/2007	Gr. Beta	13.61 ± 1.12	14.06 ± 1.08	13.84 ± 0.78	Pass
SL-3992, 3993	6/4/2007	K-40	2.43 ± 0.36	2.29 ± 0.40	2.36 ± 0.27	Pass
W-5087, 5088	6/11/2007	Gr. Beta	8.70 ± 1.90	7.70 ± 1.90	8.20 ± 1.34	Pass
SW-3710, 3711	6/14/2007	H-3	9571.51 ± 287.22	9879.21 ± 291.42	9725.36 ± 204.59	Pass
W-4062, 4063	6/28/2007	Gr. Alpha	0.76 ± 0.63	0.32 ± 0.66	0.54 ± 0.45	Pass
W-4062, 4063	6/28/2007	Gr. Beta	0.97 ± 0.53	0.58 ± 0.57	0.78 ± 0.39	Pass
AP-4448, 4449	6/28/2007	Be-7	0.10 ± 0.02	0.09 ± 0.02	0.10 ± 0.01	Pass
SG-3735, 3736	6/30/2007	Be-7	0.84 ± 0.12	0.82 ± 0.18	0.83 ± 0.11	Pass
SG-3735, 3736	6/30/2007	Cs-137	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01	Pass
SG-3735, 3736	6/30/2007	Gr. Beta	29.51 ± 2.22	30.81 ± 2.22	30.16 ± 1.57	Pass
SG-3735, 3736	6/30/2007	K-40	9.41 ± 0.31	8.90 ± 0.48	9.16 ± 0.29	Pass
LW-4175, 4176	6/30/2007	Gr. Beta	2.18 ± 0.60	1.93 ± 0.68	2.06 ± 0.45	Pass
SG-5422, 5423	7/2/2007	Gr. Alpha	10.31 ± 1.98	10.57 ± 1.99	10.44 ± 1.40	Pass
SG-5422, 5423	7/2/2007	Gr. Beta	18.59 ± 1.46	20.97 ± 1.49	19.78 ± 1.04	Pass
AP-4656, 4657	7/3/2007	Be-7	0.09 ± 0.02	0.10 ± 0.02	0.10 ± 0.01	Pass
AP-4763, 4764	7/3/2007	Be-7	0.11 ± 0.02	0.10 ± 0.02	0.11 ± 0.01	Pass
WW-4298, 4299	7/12/2007	Gr. Beta	1.74 ± 0.74	2.22 ± 0.80	1.98 ± 0.55	Pass
DW-70612, 70613	7/23/2007	Gr. Alpha	4.54 ± 1.11	4.19 ± 0.97	4.37 ± 0.74	Pass
WW-4918, 4919	7/25/2007	H-3	240.43 ± 111.12	216.68 ± 110.27	228.56 ± 78.27	Pass
MI-4742, 4743	7/26/2007	K-40	1820.30 ± 134.10	1802.90 ± 199.50	1811.60 ± 120.19	Pass
VE-4939, 4940	8/1/2007	Be-7	0.39 ± 0.21	0.45 ± 0.20	0.42 ± 0.15	Pass
VE-4939, 4940	8/1/2007	Gr. Beta	5.50 ± 0.14	5.76 ± 0.13	5.63 ± 0.10	Pass
VE-4939, 4940	8/1/2007	K-40	3.36 ± 0.45	3.36 ± 0.21	3.36 ± 0.25	Pass
SW-5218, 5219	8/7/2007	I-131	1.31 ± 0.24	1.42 ± 0.24	1.37 ± 0.17	Pass
WW-5310, 5311	8/9/2007	H-3	644.00 ± 106.00	831.00 ± 113.00	737.50 ± 77.47	Pass
SW-5393, 5394	8/14/2007	Gr. Beta	2.32 ± 1.31	1.71 ± 1.27	2.02 ± 0.92	Pass
SW-5393, 5394	8/14/2007	H-3	190.06 ± 86.80	69.05 ± 80.88	129.55 ± 59.32	Pass
W-5468, 5469	8/15/2007	H-3	262.58 ± 108.43	346.53 ± 111.42	304.55 ± 77.74	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
ve-5553, 5554	8/22/2007	K-40	1.89 ± 0.33	1.89 ± 0.22	1.89 ± 0.20	Pass
WW-5643, 5644	8/22/2007	H-3	259.00 ± 110.00	266.00 ± 110.00	262.50 ± 77.78	Pass
SWU-5799, 5800	8/28/2007	Gr. Beta	2.64 ± 1.18	3.62 ± 1.06	3.13 ± 0.79	Pass
DW-70752, 70753	8/31/2007	Gr. Alpha	14.41 ± 1.48	12.90 ± 1.50	13.66 ± 1.05	Pass
VE-5917, 5918	9/4/2007	Be-7	0.94 ± 0.17	0.83 ± 0.20	0.89 ± 0.13	Pass
VE-5917, 5918	9/4/2007	K-40	3.73 ± 0.37	3.58 ± 0.36	3.66 ± 0.26	Pass
DW-70718, 70719	9/12/2007	Gr. Alpha	23.04 ± 3.71	23.22 ± 3.61	23.13 ± 2.59	Pass
DW-70718, 70719	9/12/2007	Gr. Beta	16.13 ± 1.59	17.36 ± 1.69	16.75 ± 1.16	Pass
SO-6156, 6157	9/14/2007	H-3	181.99 ± 90.67	232.19 ± 92.95	207.09 ± 64.92	Pass

Note: Duplicate analyses are performed on every twentieth sample received in-house. Results are not listed for those analyses with activities that measure below the LLD.

^a Results are reported in units of pCi/L, except for air filters (pCi/Filter), food products, vegetation, soil, sediment (pCi/g).

^b 200 minute count time or longer, resulting in lower error.

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)^g.

Lab Code ^c	Date	Analysis	Concentration ^b		Control Limits ^d	Acceptance
			Laboratory result	Known Activity		
STW-1110	01/01/07	Gr. Alpha	0.45 ± 0.08	0.33	0.00 - 0.65	Pass
STW-1110	01/01/07	Gr. Beta	0.90 ± 0.14	0.85	0.43 - 1.28	Pass
STW-1111 ^e	01/01/07	Am-241	2.80 ± 0.21	1.71	1.20 - 2.22	Fail
STW-1111	01/01/07	Co-57	151.60 ± 10.00	143.70	100.60 - 186.80	Pass
STW-1111	01/01/07	Cs-134	79.20 ± 8.00	83.50	58.50 - 108.60	Pass
STW-1111	01/01/07	Cs-137	168.70 ± 12.10	163.00	114.10 - 211.90	Pass
STW-1111	01/01/07	Fe-55	130.30 ± 19.90	129.30	90.50 - 168.10	Pass
STW-1111	01/01/07	H-3	262.20 ± 9.10	283.00	198.10 - 367.90	Pass
STW-1111	01/01/07	Mn-54	130.60 ± 11.50	123.80	86.70 - 160.90	Pass
STW-1111	01/01/07	Ni-63	127.80 ± 3.60	130.40	91.30 - 169.50	Pass
STW-1111	01/01/07	Ni-63	127.80 ± 3.60	130.40	91.30 - 169.50	Pass
STW-1111	01/01/07	Pu-238	2.03 ± 0.17	2.25	1.58 - 2.93	Pass
STW-1111	01/01/07	Pu-239/40	2.27 ± 0.17	2.22	1.55 - 2.89	Pass
STW-1111	01/01/07	Sr-90	9.60 ± 1.40	8.87	6.21 - 11.53	Pass
STW-1111	01/01/07	Tc-99	8.80 ± 1.50	88.00	7.40 - 13.70	Pass
STW-1111	01/01/07	U-233/4	2.44 ± 0.21	2.49	1.74 - 3.24	Pass
STW-1111	01/01/07	U-238	2.44 ± 0.21	2.48	1.74 - 3.22	Pass
STW-1111	01/01/07	Zn-65	123.70 ± 17.00	114.80	80.40 - 149.20	Pass
STSO-1112 ^f	01/01/07	Am-241	46.40 ± 9.00	34.80	24.40 - 45.20	Fail
STSO-1112	01/01/07	Co-57	501.20 ± 2.90	471.20	329.80 - 612.60	Pass
STSO-1112	01/01/07	Co-60	285.90 ± 2.10	274.70	192.30 - 357.10	Pass
STSO-1112	01/01/07	Cs-134	325.90 ± 7.40	327.40	229.20 - 425.60	Pass
STSO-1112	01/01/07	Cs-137	855.70 ± 4.60	799.70	559.80 - 1039.60	Pass
STSO-1112	01/01/07	Mn-54	750.90 ± 4.70	685.20	479.60 - 890.80	Pass
STAP-1113	01/01/07	Gr. Alpha	0.27 ± 0.04	0.60	0.00 - 1.20	Pass
STAP-1113	01/01/07	Gr. Beta	0.57 ± 0.05	0.44	0.22 - 0.66	Pass
STAP-1114	01/01/07	Am-241	0.10 ± 0.03	0.10	0.07 - 0.13	Pass
STAP-1114	01/01/07	Co-57	3.51 ± 0.07	2.89	2.02 - 3.75	Pass
STAP-1114	01/01/07	Co-60	2.98 ± 0.10	2.91	2.03 - 3.78	Pass
STAP-1114	01/01/07	Cs-134	4.02 ± 0.16	4.20	2.94 - 5.45	Pass
STAP-1114	01/01/07	Cs-137	2.75 ± 0.12	2.57	1.80 - 3.34	Pass
STAP-1114	01/01/07	Mn-54	3.94 ± 0.12	3.52	2.46 - 4.57	Pass
STAP-1114	01/01/07	Pu-238	0.07 ± 0.01	0.07	0.05 - 0.09	Pass
STAP-1114	01/01/07	Pu-239/40	0.08 ± 0.01	0.08	0.06 - 0.11	Pass
STAP-1114	01/01/07	Sr-90	0.58 ± 0.18	0.61	0.43 - 0.79	Pass
STAP-1114	01/01/07	U-233/4	0.09 ± 0.01	0.10	0.07 - 0.13	Pass
STAP-1114	01/01/07	U-238	0.09 ± 0.01	0.10	0.07 - 0.13	Pass
STAP-1114	01/01/07	Zn-65	2.70 ± 0.10	2.68	1.88 - 3.49	Pass

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)^a.

Lab Code ^c	Date	Analysis	Concentration ^b		Control Limits ^d	Acceptance
			Laboratory result	Known Activity		
STVE-1115	01/01/07	Co-57	8.90 ± 0.20	8.19	5.73 - 10.64	Pass
STVE-1115	01/01/07	Co-60	6.50 ± 0.20	5.82	4.08 - 7.57	Pass
STVE-1115	01/01/07	Cs-134	6.90 ± 0.30	6.21	4.35 - 8.07	Pass
STVE-1115	01/01/07	Cs-137	8.20 ± 0.30	6.99	4.90 - 9.09	Pass
STVE-1115	01/01/07	Mn-54	10.10 ± 0.30	8.46	5.91 - 10.98	Pass

^a Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the Department of Energy's Mixed Analyte Performance Evaluation Program, Idaho Operations office, Idaho Falls, Idaho

^b Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation).

^c Laboratory codes as follows: STW (water), STAP (air filter), STSQ (soil), STVE (vegetation).

^d MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP.

^e Result of reanalysis, 2.08 ± 0.13 pCi/L.

^f The test samples were recounted on lower background detectors. Result of the recounts: 41.4 ± 6.3 Bq/kg.

TABLE A-7. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)^a.

Lab Code ^b	Date	Analysis	Concentration (pCi/L)		Control Limits	Acceptance
			Laboratory Result ^c	ERA Result ^d		
STAP-1116	03/19/07	Gr. Alpha	34.64 ± 2.56	25.8	12.4 - 39	Pass
STAP-1116	03/19/07	Gr. Beta	93.41 ± 3.20	79.5	48.8 - 116	Pass
STAP-1117	03/19/07	Am-241	56.04 ± 3.90	57.5	33.1 - 80	Pass
STAP-1117	03/19/07	Co-60	1610.00 ± 8.40	1300.0	1010.0 - 1620	Pass
STAP-1117	03/19/07	Cs-134	1340.40 ± 48.84	1120.0	732.0 - 1380	Pass
STSO-1117 ^e	03/19/07	Cs-137	345.30 ± 8.20	255.0	192.0 - 336	Fail
STSO-1117 ^f	03/19/07	Fe-55	< 134.0	0.0		Pass
STSO-1117 ^f	03/19/07	Mn-54	< 5.0	0.0		Pass
STAP-1117	03/19/07	Pu-238	43.32 ± 2.28	37.4	25.7 - 49	Pass
STAP-1117	03/19/07	Pu-239/40	35.23 ± 2.24	31.6	22.9 - 41	Pass
STAP-1117	03/19/07	Sr-90	156.10 ± 6.60	156.0	66.6 - 246	Pass
STAP-1117	03/19/07	U-233/4	42.22 ± 1.84	47.8	30.1 - 71	Pass
STAP-1117	03/19/07	U-238	42.00 ± 1.84	47.4	30.2 - 68	Pass
STAP-1117	03/19/07	Uranium	85.79 ± 3.60	97.3	49.5 - 155	Pass
STAP-1117	03/19/07	Zn-65	363.80 ± 11.90	245.0	208.0 - 412	Pass
STSO-1118	03/19/07	Ac-228	3097.77 ± 94.96	2790.0	1790.0 - 3930	Pass
STSO-1118	03/19/07	Am-241	1000.70 ± 156.10	927.0	548.0 - 1200	Pass
STSO-1118	03/19/07	Bi-212	2467.87 ± 114.33	2500.0	658.0 - 3730	Pass
STSO-1118	03/19/07	Co-60	7847.40 ± 86.60	7330.0	5340.0 - 9820	Pass
STSO-1118	03/19/07	Cs-134	7910.60 ± 356.88	7560.0	4850.0 - 9070	Pass
STSO-1118	03/19/07	Cs-137	4635.00 ± 99.10	4300.0	3290.0 - 5580	Pass
STSO-1118	03/19/07	K-40	12201.60 ± 423.20	11100.0	8050.0 - 15000	Pass
STSO-1118 ^f	03/19/07	Mn-54	< 34.0	0.0		Pass
STSO-1118	03/19/07	Pb-212	2046.80 ± 127.20	1730.0	1120.0 - 2430	Pass
STSO-1118	03/19/07	Pb-214	4142.80 ± 110.40	3330.0	1980.0 - 4980	Pass
STSO-1118	03/19/07	Pu-238	1099.20 ± 73.10	857.0	490.0 - 1200	Pass
STSO-1118	03/19/07	Pu-239/40	1586.10 ± 82.00	1360.0	928.0 - 1810	Pass
STSO-1118	03/19/07	Sr-90	6163.30 ± 791.60	7500.0	2610.0 - 12400	Pass
STSO-1118	03/19/07	Th-234	4329.40 ± 569.10	3590.0	2190.0 - 4560	Pass
STSO-1118	03/19/07	U-233/4	3236.70 ± 106.00	3620.0	2280.0 - 4520	Pass
STSO-1118	03/19/07	U-238	3425.20 ± 134.00	3590.0	2190.0 - 4560	Pass
STSO-1118	03/19/07	Uranium	6787.80 ± 240.00	7380.0	4210.0 - 9930	Pass
STSO-1118	03/19/07	Uranium	6787.80 ± 240.00	7380.0	4210.0 - 9930	Pass
STSO-1118 ^f	03/19/07	Zn-65	0.00 ± 0.00	0.0	0.0 - 0	Pass

TABLE A-7. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)^a.

Lab Code ^b	Date	Analysis	Concentration (pCi/L)		Control Limits	Acceptance
			Laboratory Result ^c	ERA Result ^d		
STVE-1119	03/19/07	Am-241	3249.60 ± 150.30	3550.0	2020.0 - 4890	Pass
STVE-1119	03/19/07	Cm-244	1860.70 ± 91.50	1840.0	905.0 - 2870	Pass
STVE-1119	03/19/07	Co-60	2827.90 ± 62.40	2600.0	1760.0 - 3720	Pass
STVE-1119	03/19/07	Cs-134	654.80 ± 48.40	579.0	308.0 - 822	Pass
STVE-1119	03/19/07	Cs-137	3307.30 ± 58.80	2920.0	2150.0 - 4060	Pass
STVE-1119	03/19/07	K-40	40814.20 ± 618.80	37900.0	27200.0 - 53600	Pass
STVE-1119 ^f	03/19/07	Mn-54	< 27.6	0.0		Pass
STVE-1119	03/19/07	Pu-238	2762.00 ± 251.10	2430.0	1250.0 - 3600	Pass
STVE-1119	03/19/07	Pu-239/40	2156.60 ± 83.40	1900.0	1180.0 - 2600	Pass
STVE-1119	03/19/07	Sr-90	8999.70 ± 580.90	8890.0	4900.0 - 11800	Pass
STVE-1119	03/19/07	U-233/4	2821.90 ± 73.50	2940.0	1930.0 - 3920	Pass
STVE-1119	03/19/07	U-238	2896.10 ± 50.70	2910.0	2090.0 - 3610	Pass
STVE-1119	03/19/07	Uranium	5718.00 ± 124.15	5980.0	4110.0 - 7770	Pass
STVE-1119	03/19/07	Zn-65	474.30 ± 45.70	366.0	267.0 - 500	Pass
STW-1120	03/19/07	Am-241	133.50 ± 10.60	179.0	123.0 - 243	Pass
STW-1120	03/19/07	Co-60	541.40 ± 9.00	536.0	467.0 - 631	Pass
STW-1120	03/19/07	Cs-134	1623.80 ± 66.10	1750.0	1290.0 - 2020	Pass
STW-1120	03/19/07	Cs-137	1839.10 ± 17.90	1850.0	1570.0 - 2220	Pass
STW-1120	03/19/07	Fe-55	829.50 ± 226.80	671.0	392.0 - 896	Pass
STW-1120 ^f	03/19/07	Mn-54	< 8.1	0.0		Pass
STW-1120	03/19/07	Pu-238	123.30 ± 4.30	116.0	87.6 - 144	Pass
STW-1120	03/19/07	Pu-239/40	95.10 ± 3.80	90.9	70.3 - 113	Pass
STW-1120	03/19/07	Sr-90	949.40 ± 16.70	989.0	630.0 - 1320	Pass
STW-1120	03/19/07	U-233/4	164.20 ± 6.58	192.0	145.0 - 247	Pass
STW-1120	03/19/07	U-238	169.20 ± 8.22	190.0	145.0 - 236	Pass
STW-1120	03/19/07	Uranium	339.60 ± 10.66	391.0	282.0 - 521	Pass
STW-1120	03/19/07	Zn-65	2009.00 ± 36.40	1910.0	1600.0 - 2410	Pass

^a Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurements Laboratory Quality Assessment Program (EML).

^b Laboratory codes as follows: STW (water), STAP (air filter), STSO (soil), STVE (vegetation).

^c Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

^d Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

^e A high bias (~ 20%) was observed in gamma results for air filters. A composite filter geometry was used in the calculations vs. a single filter geometry. Result of recalculation. Cs-137, 305.8 ± 6.0 pCi/filter.

^f Included in the testing series as a "false positive". No activity expected.

Appendix C
Data Assessment
September/October 2007
Monitoring Event

RADIOCHEMICAL DATA REVIEW

The purpose of the radiochemical data review is to determine the range of background concentrations of tritium in groundwater at Davis-Besse and to identify the concentration above which would signify detections above background in the data set. Since tritium was the only radiological compound detected in water samples above the MDC, the analysis is only performed for tritium.

Low level concentrations reported by the laboratory may reflect 1.) uncertainty in the sample and laboratory analysis; 2.) tritium from historic atmospheric bomb testing; 3.) tritium from cosmic ray interactions in the earth's atmosphere; or 4.) localized tritium washout from continuous and batch gaseous releases. In order to assess these local background condition levels, a statistical approach was used following industry guidance (EPRI, 2005) to evaluate the significance of the low level detections.

Local background concentrations can also be defined by comparing reported tritium values from wells upstream of potential radiological source(s) of release. For example, wells MW-100 is located hydraulically up-gradient of potential source(s) of liquid tritium released from the Power Block. The reported concentrations of tritium were: <193, <193 and <149 for MW-100-A, -B and -C, respectively. The mean value is <178 pCi/L. This low level concentration limit provides a reference at which to evaluate reported results from samples collected down-gradient and cross-gradient of the Power Block. It is noted that MW-100A, -B and -C were sampled once; therefore, the background reference may change if more up-gradient wells were available.

Additional evaluation of background can be performed by evaluating the reported concentrations in groundwater against concentrations in surface water from Lake Erie.

A statistical approach was also used to define local background conditions. The results reported by Midwest Laboratory were compared against 2-sigma (σ) total propagated uncertainty (TPU) of the analysis, with a 95% confidence level. The 2- σ TPU value combines counting uncertainty and any other factors that contribute to the overall uncertainty including uncertainties in the sample mass, chemical yield and determination of calibration factors.

The 2- σ TPU was estimated by calculating a raw standard deviation using the field and laboratory duplicate data collected during both the June 2007 and September/October 2007 event (Table 7). Both sets of data were used to provide a sufficient number of comparisons (i.e., population statistics) that could not be achieved if only using the September /October 2007 data. The field duplicates and laboratory duplicates from both events were used to measure the total uncertainty and evaluate the quality of the TPU estimate.

The raw 2- σ standard deviation was calculated at 87.3 pCi/L. The raw 2- σ standard deviation includes the effects of stochastic variations, volume measurements, calibration errors, and chemical factors. A Student's *t* correction factor was calculated (1.9432) because the sample size is less than 30 sample pairs. The correction factor was applied to calculate the upper 95% limit of the TPU, which was thereby established to be 170 pCi/L. Given the limited sample population, the 2- σ TPU values are preliminary and their robustness will increase with future monitoring events as more duplicate sample pairs are included in the analysis. As the number of duplicate sample pairs increases, the correction factor will decrease.

Statistical analysis and verification of the June and September/October 2007 results for tritium are summarized in the following table:

Value	Concentration (pCi/L)	Comment
Up-gradient well	178	mean LLD from well MW-10
Typical MDC	183	Reported result from well MW-31D
2- σ TPU	170	Upper 95% confidence level
Statistical decision level	348	Data reporting convention (EPRI, 2005); sum of background well and 2- σ TPU

The TPU and the sub components of the TPU were evaluated for reasonableness and internal consistency. The data satisfy all quality requirement considerations. For the data presented here, individual measurements between 178 and 348 pCi/L represent statistically insignificant activity at the 95% confidence level.

Individual measurement results above the decision level (i.e., 348 pCi/L) represent concentrations that are statistically greater than background and likely warrant additional monitoring. Monitoring wells where the net concentration was detected above the action level included MW-12D (738

pCi/L), MW-15D (442 pCi/L), MW-30S (494 pCi/L), MW-31S (3,149 pCi/L), MW-35D (368 pCi/L), MW-102A LD (387 pCi/L), MW-102B (394 pCi/L), MW-103A (495 pCi/L), MW-103B (362 pCi/L), and MW-105A (1,832 pCi/L), (Table 7).

QUALITY ASSURANCE - QUALITY CONTROL

1.0 INTRODUCTION

This section presents a quality assurance and quality control (QA/QC) review of the Davis-Besse September/October 2007 groundwater sampling event. This evaluation was conducted to assess and enhance the reliability and validity of the groundwater analytical data. The verification process was conducted to identify the most common sampling and analytical problems that could affect the quality of the results. In general the results met the data quality objectives.

2.0 QUALITY ASSURANCE

Quality assurance involves planned and systematic actions necessary to provide confidence in the analytical results. The goal of the QA program is to have a program that is operating within acceptable criteria; thereby enhancing the representativeness and comparability of the results. Qualitative measures include items related to the field as well as the laboratory activities.

2.1 SAMPLING PROGRAM

The procedures used to collect the groundwater samples were detailed in a FSP (ERM, 20 September 2007). Specifications, such as well locations, well construction, sampling intervals, sampling and analysis techniques were items among others that were described to evaluate the representativeness of the groundwater samples collected. Groundwater samples were collected by personnel from the BETA Laboratory. Field notes were reviewed to assess if the procedures were executed properly. The following information reviews items were included in the field sampling quality assurance program.

- **Sampling documentation** - The sample team maintained a field notebook (bound weatherproof logbooks) that was filled out at

each location where a sample was collected. It contains the sample designation, collection time, description, and field instrument calibration log. The team also completed a Low-Flow Groundwater Sampling Form at each monitored location. The forms present information regarding location, weather, time, well construction, sampling depth, sampling device, field parameters and sample containers. The completed Low-Flow Groundwater Sampling forms are included within Appendix C.

- **Sample Identification** - Well IDs were used to identify the groundwater samples. The same codes were used to complete the chain-of-custodies (COCs). Duplicate samples were recorded as blind samples. Actual duplicate sample IDs were recorded on each Low-Flow Groundwater Sampling Form. COC records are included within Appendix C.
- **Decontamination** - Dedicated high density polyethylene (HDPE) tubing was used at each location. Wells were sampled using either a peristaltic pump (30 wells, no decontamination required) or a bladder pump (2 wells, pump decontaminated after each use). An equipment blank sample was collected from the bladder pump after sampling at monitoring well MW-101C.
- **Calibration and Preventive Maintenance of Field Instruments** - Sampling team personnel calibrated the geochemical parameter probe every day before starting the sampling. Calibration logs were maintained in the notebook.
- **Sampling locations** - All locations were sampled as planned in the FSP.
- **Gauging** - A synoptic water level gauging round including all of the monitoring wells selected for the evaluation of tritium and gamma emitting radionuclides was performed on 24 September 2007 prior to sampling.
- **Sampling Depths** - Sampling depths were reported on the individual Low-Flow Groundwater Sampling Forms. Sampling depths were consistent with sampling depths recommended in the Field Sampling Plan.
- **Field Duplicates** - All duplicate samples were collected in accordance with the FSP with the exception of sample duplicate DBD-04 that was taken at monitoring well MW-103B and not MW-

104B because of the unexpected low groundwater elevation at MW-104B. This change did not affect the data quality.

2.2

ANALYTICAL PROGRAM

Groundwater samples were analyzed by Midwest Laboratory for analysis of tritium by EPA Method 906.0 and gamma emitting radionuclides by EPA Method 901.1 as specified within the FSP. Midwest Laboratory currently performs radiological environmental monitoring for over 20 nuclear power plants in 11 states. In addition, the laboratory is certified to perform analysis of drinking water for radionuclides in Illinois, Indiana, Wisconsin, and Kentucky. Midwest Laboratory maintains a Quality Assurance / Quality Control Program based on 10 CFR Part 50, Appendix B and Reg. Guide 4.15.

3.0

QUALITY CONTROL

The analytical data were assessed in terms of precision, accuracy, representativeness, comparability and completeness (PARCCs) to evaluate the usability of the results generated. Quality control items were evaluated through laboratory checks (e.g., matrix spikes, duplicate samples), and sampling method reviews (equipment blanks, trip blanks). In addition, Midwest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of their quality control program in December 1971. Results of the interlaboratory program are presented at the end of this appendix.

The following information provides background on the types of QC samples that were used to evaluate if the data quality objectives of the sampling program were met. Assessment of data quality based on compliance with PARCCs criteria is presented in the following.

- **Precision** - United States Environmental Protection Agency (EPA) guidance suggests that the Relative Percent Difference (RPD) of field duplicates should be less than 30 percent in water samples. The RPD is calculated as:

$$RPD = \frac{| \text{Sample} - \text{Duplicate} |}{(\text{Sample} + \text{Duplicate}) / 2}$$

Calculated RPD values for the tritium results were within guidelines and are presented in the following table.

Field Duplicate RPD Calculations

Sample ID	Duplicate ID	Sample Result	Duplicate Result	RPD
MW-12D	DBD-01	738	769	4 %
MW-20S	DBD-02	189	218	14 %
MW-31S	DBD-03	3,149	3,012	4 %
MW-103B	DBD-04	362	394	9 %

- **Accuracy** - Matrix spike/matrix spike duplicate (MS/MSD), and laboratory control/ laboratory control duplicate sample are documented in the attached laboratory reports. These indicators are used to assess if the matrix may be biasing the reported results high (generally based on greater than 130 percent recovery) or low (generally based on less than 70 percent recovery). RPDs are generally expected to be less than 30 percent between MS and MSD results. As shown in the following table, all RPDs for tritium and cesium were within acceptable ranges.

Matrix Spike/Matrix Spike Duplicate RPD Calculations

Sample ID	Compound	MS/MSD ID	Spike + Initial Sample Activities	Sample Result	RPD
MW-30S	Tritium	MS01-MW-100A	17,185	16,321	5 %
MW-30S	Tritium	MSD01-MW-100A	17,185	16,925	2 %
MW-30S	Cs-137	MS01-MW-100A	65.6	68.6	4 %
MW-30S	Cs-137	MSD01-MW-100A	65.6	70.2	7 %
MW-100A	Tritium	MS02-MW-30S	27,990	26,895	4 %
MW-100A	Tritium	MSD02-MW-30S	27,990	26,895	4 %
MW-100A	Cs-137	MS02-MW-30S	98.4	109.1	10 %
MW-100A	Cs-137	MSD02-MW-30S	98.4	108.4	10 %

No Cesium was detected in the actual samples. Values indicate actual spike activity.

- **Representativeness and Comparability** - The representativeness and comparability of analytical data was qualitatively evaluated by

comparing sample results from the same locations between the September/October 2007 and the June and July/August 2007 monitoring events.

Groundwater Tritium Results Comparison - 1st, 2nd & 3rd Sampling rounds

Monitoring Well	June or July/August 2007 H-3 Activity	Sept/Oct 2007 H-3 Activity	RPD
MW-12S	860	276	103 %
MW-12D	1,155	738	44 %
MW-15S	375	301	22 %
MW-15D	704	442	46 %
MW-20S	279	189	39 %
MW-20D	328	<174	NA
MW-30S	1,149	494	80 %
MW-30D	231	<174	NA
MW-31S	7,322	3,149	80 %
MW-31D	108	183	180 %
MW-33S	2,702	1,110	84 %
MW-33D	3,271	1,934	54 %
MW-37S	2,961	1,231	44 %

NA: Not Applicable

Tritium activities decreased in average by 29% between the June/July/August and September/October sampling events. Additional monitoring will be necessary to evaluate if this trend is representative of long-term groundwater quality.

Tritium was not detected in the equipment blank above the minimum detectable concentration (MDC), signifying that tritium was not cross-contaminated between samples. The absence of cross-contamination signifies that the reported results are most likely representative of groundwater quality at each monitoring well.

- **Completeness** - Based on review of sampling and laboratory check-in procedures, as well as field and laboratory QA/QC results, the data is considered to be complete and useable.
- **Sensitivity** - The MDCs were consistent with data quality objectives (at least 200 pCi/L) as they ranged between 149 and 193 pCi/L for tritium and 1.4 and 14.4 pCi/L for the gamma emitting radionuclides, which allowed to establish if results were below site background. The 200 pCi/L value corresponds to an environmental level that would allow evaluating an eventual release of tritium to the environment.

4.0

CONCLUSION

Based on the review of the QA/QC information summarized above, the data meet the data quality objectives defined in the FSP.

Site Name: DAVIS-BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-12S
 Date: 10/4/07
 Sampling Personnel: G. Murdock, A.M. Percival
 Weather Conditions: Partly cloudy, 62°F, winds S @ 2 mph
 Time: 0930-1028
 File Name: DB-12S

Total Depth (I.D.): 41.15' Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 15.12' Well Diameter: ⁽²⁾ 3"
 Total Volume Purged: 3 gal Casing Type: PVC
 Purge Rate: 200 ml/min Sampling Device: peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC pipe
 Pump Intake (ft below M.P.): 32' color: clear odor: none

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ³	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	15.12	185 ml/min	18.34	2,123	3.32	7.26	96.9	4.17
5:00	15.15	190 ml/min	18.28	2,126	2.80	7.26	100.1	7.51
10:00	15.14	200 ml/min	17.94	2,121	2.95	7.26	101.5	4.24
15:00	15.14	210 ml/min	18.00	2,118	3.41	7.27	98.8	1.85
20:00	15.14	205 ml/min	17.87	2,114	3.44	7.27	96.7	2.05
25:00	15.14	210 ml/min	17.96	2,113	3.60	7.27	94.9	2.28
30:00	15.14	210 ml/min	17.87	2,111	3.68	7.27	93.3	1.47
35:00	15.14	200 ml/min	17.97	2,111	3.87	7.28	91.3	1.27
40:00	15.14	200 ml/min	18.01	2,110	3.67	7.28	90.3	1.31
45:00	15.14	205 ml/min	17.99	2,111	3.85	7.28	89.6	0.71
50:00	15.14	200 ml/min	17.90	2,106	3.89	7.28	88.4	1.08
55:00	15.14	200 ml/min	17.91	2,105	3.87	7.28	87.9	1.02
60:00	15.14	205 ml/min	17.91	2,103	3.80	7.28	87.9	0.49
65:00	15.14	205 ml/min	17.87	2,101	3.60	7.28	87.2	0.50
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1028-1048

Samples Collected: Analysis Requested: Preservative: Holding Time: Lab:

MW-12S Gamma, Tritium none

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft)
- (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW-12D
 Date: 10/14/07
 Sampling Personnel: EGMURDOCK, AM PERCIAL
 Weather Conditions: partly cloudy, 75°F, winds S @ 2 mph
 Time: 1029-1252

File Name: DB-12D

Total Depth (I.D.): ^{to top of} 14.86' 8132' Screen Length: 71'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.86' Well Diameter: 3"
 Total Volume Purged: 4.759 gallons Casing Type: PVC
 Purge Rate: 200 ml/min Sampling Device: Peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC pipe
 Pump Intake (ft below M.P.): 71' color: slight gray odor: medium

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (µS/cm)	DO (mg/L)	pH std units	ORP mV	Turb. NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.86	195 ml/min	18.75	3,537	3.28	7.18	-259.3	2.13
5:00	14.96	200 ml/min	18.67	3,552	3.19	7.16	-278.5	2.32
10:00	14.96	205 ml/min	18.77	3,543	3.53	7.16	-282.9	3.10
15:00	14.96	210 ml/min	18.38	3,545	4.41	7.15	-284.2	3.29
20:00	14.97	220 ml/min	18.25	3,609	4.34	7.14	-289.2	2.87
25:00	14.97	192 ml/min	18.46	3,726	4.39	7.14	-292.6	3.78
30:00	14.96	190 ml/min	18.71	3,779	4.49	7.13	-294.6	4.27
35:00	14.96	200 ml/min	18.69	3,778	4.91	7.13	-295.0	4.67
40:00	14.96	196 ml/min	18.75	3,767	4.47	7.13	-295.0	4.98
45:00	14.96	198 ml/min	18.72	3,733	4.77	7.13	-294.5	4.08
50:00	14.96	196 ml/min	18.62	3,699	6.19	7.13	-293.0	5.98
55:00	14.96	200 ml/min	18.57	3,685	5.91	7.13	-294.0	3.15
60:00	14.96	200 ml/min	18.44	3,690	6.50	7.13	-294.1	2.41
65:00	14.96	200 ml/min	18.67	3,691	6.21	7.13	-293.7	3.24
70:00	14.96	205 ml/min	18.60	3,659	5.80	7.13	-293.4	3.86
75:00	14.96	207 ml/min	18.61	3,653	6.49	7.13	-293.6	1.32
80:00	14.96	200 ml/min	18.66	3,629	6.56	7.13	-293.7	1.72
85:00	14.96	195 ml/min	18.65	3,627	6.16	7.13	-293.0	1.92
90:00	14.96	195 ml/min	18.79	3,633	6.30	7.13	-293.2	1.89
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1252-1338

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-12D Gamma, Tritium none
DBD-01 Gamma, Tritium none

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS BEESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-155
 Date: 10/10/07
 Sampling Personnel: C. Lamb, Morigarity, E. G. Murock, J. D. Harris 6
 Weather Conditions: cloudy winds N @ 3 mph 55°
 Time: 1315 - 1352
 File Name: DB155

Total Depth (I.D.): 42.86' Screen Length: center 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.29' Well Diameter: 3"
 Total Volume Purged: 2 gal Casing Type: PVC
 Purge Rate: 210 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 32' color: (red) odor: none

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.31	185 ml/min.	20.69	2362	2.66	7.13	514	1.07
5:00	14.30	175 ml/min.	20.78	2365	2.81	7.13	473	0.36
10:00	14.31	205 ml/min.	20.98	2375	2.22	7.13	467	0.24
15:00	14.31	215 ml/min.	21.08	2376	2.13	7.13	453	0.37
20:00	14.31	225 ml/min.	21.02	2358	1.66	7.15	433	0.89
25:00	14.31	235 ml/min.	21.07	2347	1.68	7.16	428	0.53
30:00	14.31	213 ml/min	20.98	2337	1.77	7.16	424	0.25
35:00	14.32	210 ml/min	20.98	2327	1.68	7.16	421	0.26
40:00								
45:00								
50:00								
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE
1353

Sampling Time: 1353-1412
 Samples Collected: MW-155 Analysis Requested: TRITILUM, SAMMA Preservative: NONE Holding Time: Lab:

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS Resse
 Low-Flow Groundwater Sampling Form

Well ID: MW-15D
 Date: 10/10/07
 Sampling Personnel: EG, J. DODD, CK, J. D. AGGIS, P. MORIARTY X
 Weather Conditions: rain 56° cloudy, winds NW @ 10 mph
 Time: 1420-1627
 File Name: DB15D

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Total Depth (I.D.): 81' Screen Length: 70'
 Depth to Water (D.T.W.): 14.44' Well Diameter: 3"
 Total Volume Purged: 229 gal Casing Type: PVC
 Purge Rate: 200 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 90' color: clear odor: strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.44	230 ml/min.	21.16	2115	4.85	7.18	-243	0.19
5:00	14.44	230 ml/min.	20.97	4617	2.47	7.15	-273.2	1.25
10:00	14.45	240 ml/min.	20.90	4352	2.67	7.13	-311.9	0.65
15:00	14.45	215 ml/min.	20.91	4600	3.55	7.14	-331.1	0.35
20:00	14.45	225 ml/min.	20.88	4604	3.24	7.13	-332.6	0.56
25:00	14.45	220 ml/min.	20.84	4604	3.50	7.12	-332.5	0.32
30:00	14.45	215 ml/min.	20.86	4724	3.72	7.11	-332.5	0.35
35:00	14.44	170 ml/min.	20.92	4850	4.17	7.09	-333.3	0.31
40:00	14.44	213 ml/min.	21.03	4908	4.44	7.09	-334.2	0.59
45:00	14.45	215 ml/min.	20.84	4913	4.77	7.09	-338.2	0.26
50:00	14.45	215 ml/min.	20.65	4902	5.25	7.08	-339.5	0.19
55:00	14.45	213 ml/min.	20.65	4833	5.59	7.08	-326.1	0.26
60:00	14.45	220 ml/min.	20.61	4870	5.81	7.08	-338.6	0.16
65:00	14.45	215 ml/min.	20.54	4860	6.14	7.07	-324.6	0.42
70:00	14.46	220 ml/min.	20.47	4847	6.50	7.07	-327.3	0.18
75:00	14.46	220 ml/min.	20.46	4839	7.19	7.07	-326.4	0.31
80:00	14.46	210 ml/min.	20.51	4837	7.42	7.07	-323.4	0.04
85:00	14.47	210 ml/min.	20.47	4833	8.01	7.06	-322.6	0.19
90:00	14.48	210 ml/min.	20.50	4824	8.68	7.06	-323.8	0.08
95:00	14.48	205 ml/min.	20.50	4812	9.10	7.06	-324.5	0.25
100:00	14.48	202 ml/min.	20.50	4812	9.75	7.06	-323.8	0.17
105:00	14.48	200 ml/min.	20.45	4813	10.23	7.05	-323.1	0.18
110:00	14.47	200 ml/min.	20.43	4819	10.96	7.05	-322.8	0.36
115:00	14.48	202 ml/min.	20.39	4807	11.89	7.05	-323.2	0.14
120:00	14.48	200 ml/min.	20.33	4800	12.48	7.04	-324.2	0.15

Sampling Time: 1628 - 1652 GLM 10/10/07
 Samples Collected: EG Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-15D TRITURB, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

1062

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-15D
 Date: 10/10/07
 Sampling Personnel: CLM, EGM, J.D. Harris B
 Weather Conditions:
 Time:
 File Name: DB15D

Total Depth (I.D.): _____ Screen Length: _____
 Depth to Water (D.T.W.): ⁽¹⁾ _____ Well Diameter: _____
 Total Volume Purged: See pg 1 of 2 Casing Type: _____
 Purge Rate: 100 L Sampling Device: _____
 Tubing Type: _____ Measuring Point: _____
 Pump Intake (ft below M.P.): _____ color: _____ odor: _____

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.49	200 ml/min	20.33	4798	13.62	7.04	-321.8	0.23
5:00	14.49	200 ml/min	20.31	4790	13.49	7.04	-319.5	0.48
10:00	14.49	200 ml/min	20.27	4790	13.66	7.04	-320.6	0.48
15:00								
20:00								
25:00								
30:00								
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85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: See pg. 1 of 2
 Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabalization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

2 of 2

Site Name: DAVIS BESS
 Low-Flow Groundwater Sampling Form

Well ID: MW-205
 Date: 10/9/07
 Sampling Personnel: C. Lamb, M. Moriarty, E. G. Murdock
 Weather Conditions: 71° clear, winds W @ 10 mph
 Time: 1312-1402
 File Name: DB205

Total Depth (I.D.): 42.56' Screen Length: Center 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.29' Well Diameter: 3"
 Total Volume Purged: 2.4 gal Casing Type: PVC
 Purge Rate: 200 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 32' color: clear odor: None

tb

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.31	200 ml/min	18.94	2180	2.11	7.19	-36.3	1.23
5:00	14.31	205 ml/min	18.79	2182	2.25	7.18	-34.2	0.54
10:00	14.31	187 ml/min	18.85	2178	2.11	7.18	-33.9	0.83
15:00	14.31	183 ml/min	18.87	2179	2.23	7.19	-34.7	0.91
20:00	14.31	205 ml/min	18.60	2188	2.29	7.18	-31.5	0.03
25:00	14.31	205 ml/min	18.53	2197	2.37	7.18	-30.9	0.69
30:00	14.31	212 ml/min	18.48	2231	1.79	7.19	-34.9	0.29
35:00	14.31	205 ml/min	18.54	2230	1.82	7.18	-31.0	0.18
40:00	14.31	185 ml/min	18.75	2235	1.78	7.19	-30.3	0.20
45:00	14.31	195 ml/min	18.91	2233	1.71	7.18	-31.1	0.11
50:00								
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
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115:00								
120:00								

SAMPLE

Sampling Time: 1405-1448

Samples Collected: MW-205 Analysis Requested: TRITIUM, GAMMA Preservative: NONE Holding Time: Lab:

DBD-02 TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS GESS
 Low-Flow Groundwater Sampling Form

Well ID: MW-20D
 Date: 10-10-07
 Sampling Personnel: JEFF HESS, JO HESS, CURTIS
 Weather Conditions: 53°F, CLOUDY, WINDS
 Time: 0840 / 0910 - 1014
 File Name: DB20D

Total Depth (I.D.): 80.29' Screen Length: 70'
 Depth to Water (D.T.W.): (1) 14.38' / 14.41' Well Diameter: 3"
 Total Volume Purged: ~ 4.5 well Casing Type: PVC
 Purge Rate: 220 ml/min Sampling Device: Peristaltic
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 70' color: ELIAN odor: NONE

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabalization Criteria ²	(see note below) ²		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.87	195 ml/min	16.29	2091	4.38	7.24	157.5	2.52
5:00	14.94	202 ml/min	16.17	2110	3.97	7.26	170.6	2.68
10:00	14.83	188 ml/min	16.26	2136	3.13	7.31	71.9	3.35
15:00	14.99	197 ml/min	16.08	2134	1.76	7.28	80.5	0.61
20:00	15.11	200 ml/min	16.21	2130	1.09	7.28	81.0	1.41
25:00	15.18	200 ml/min	16.17	2130	1.42	7.27	80.5	1.08
30:00	15.21	205 ml/min	16.16	2129	1.20	7.27	80.2	0.96
35:00	15.23	206 ml/min	16.11	2169	1.16	7.26	78.7	0.50
40:00	15.28	212 ml/min	16.26	2245	1.20	7.23	78.4	0.66
45:00	15.29	215 ml/min	16.23	2278	1.26	7.22	-67.2	0.46
50:00	15.29	220 ml/min	15.98	2292	1.28	7.23	-62.8	0.38
55:00	15.30	220 ml/min	16.01	2293	1.31	7.23	-66.7	0.58
60:00	15.32	220 ml/min	16.00	2296	1.24	7.24	-45.8	0.35
65:00	15.33	220 ml/min	16.05	2294	1.21	7.24	-56.3	0.34
70:00	15.33	218 ml/min	16.01	2300	1.25	7.24	-56.4	0.22
75:00	15.31	220 ml/min	16.03	2309	1.26	7.24	-56.4	0.30
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1015-1035

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-20D TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabalization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS BESS
 Low-Flow Groundwater Sampling Form

Well ID: MW-235
 Date: 10/10/07
 Sampling Personnel: K. Lando, Marjarity, E. G. Murdock, J. D. Harris B
 Weather Conditions: 54° cloudy, winds NW @ 5-10 mph
 Time: 1107-1229
 File Name: DA235

Total Depth (I.D.): 42.20' Center Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 13.43' Well Diameter: 3"
 Total Volume Purged: 4.4 gal Casing Type: PVC
 Purge Rate: 210 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Acrylonitrile Measuring Point: Top of Arc
 Pump Intake (ft below M.P.): 32' color: odor:

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	13.48	255 ml/min	13.80	2194	2.20	7.13	23.9	1.44
5:00	13.48	145 ml/min	13.99	2309	2.17	7.20	23.8	3.98
10:00	13.46	160 ml/min	14.14	2212	1.41	7.22	41.6	10.11
15:00	13.47	180 ml/min	13.96	2221	1.62	7.23	46.7	1.27
20:00	13.46	183 ml/min	13.88	2220	1.51	7.21	48.6	2.21
25:00	13.46	183 ml/min	13.93	2237	1.22	7.23	50.8	1.93
30:00	13.46	185 ml/min	13.84	2361	1.27	7.09	50.7	3.08
35:00	13.46	190 ml/min	13.84	2392	1.22	7.06	41.4	1.34
40:00	13.45	180 ml/min	13.98	2402	1.21	7.06	19.6	0.38
45:00	13.45	170 ml/min	13.70	2403	1.47	7.08	12.8	1.94
50:00	13.44	225 ml/min	13.65	2405	1.50	7.06	11.9	1.57
55:00	13.46	210 ml/min	13.59	2406	1.53	7.07	11.6	1.83
60:00	13.46	215 ml/min	13.74	2403	1.40	7.07	9.4	0.52
65:00	13.44	220 ml/min	13.97	2407	1.64	7.06	11.6	0.17
70:00	13.45	210 ml/min	13.74	2406	1.54	7.05	11.6	0.27
75:00	13.46	207 ml/min	13.62	2405	1.54	7.09	8.1	0.33
80:00	13.47	210 ml/min	13.60	2402	1.51	7.05	7.0	0.21
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1230 - 1250
 Samples Collected: MW-235 Analysis Requested: TRITIUM, GAMMA Preservative: NONE Holding Time: Lab:

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.3 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MLW-30S
 Date: 10/8/07
 Sampling Personnel: Lamb Moriarty E.G. MURDOCK
 Weather Conditions: Cloudy, winds N @ 8 mph 88°
 Time: 1316-1425
 File Name: DB30S

Total Depth (I.D.): 43.03' Screen Length: 30'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.93' Well Diameter: 3"
 Total Volume Purged: 4 gal Casing Type: PVC
 Purge Rate: 2.18 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 30' color: odor:

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.93	203 ml/min.	18.85	2273	6.01	7.17	25.3	1.28
5:00	14.93	210 ml/min.	18.52	2274	4.03	7.21	41.3	1.85
10:00	14.93	208 ml/min.	18.31	2272	4.36	7.18	46.7	1.62
15:00	14.92	220 ml/min.	18.85	2279	3.91	7.24	51.2	0.37
20:00	14.92	210 ml/min.	17.71	2274	3.86	7.20	50.8	0.33
25:00	14.92	215 ml/min.	17.71	2276	3.47	7.16	52.1	0.63
30:00	14.92	210 ml/min.	17.98	2271	3.37	7.20	56.7	0.14
35:00	14.92	210 ml/min.	18.31	2264	3.14	7.16	60.5	0.52
40:00	14.92	210 ml/min.	18.12	2277	2.41	7.22	58.6	0.17
45:00	14.92	240 ml/min.	18.56	2326	1.99	7.11	14.3	0.43
50:00	14.92	205 ml/min.	18.16	2348	1.44	7.12	-4.3	0.17
55:00	14.92	200 ml/min.	18.48	2361	1.43	7.20	-16.3	0.87
60:00	14.92	220 ml/min.	17.65	2358	1.35	7.20	-20.1	0.70
65:00	14.92	220 ml/min.	17.75	2354	1.30	7.14	-24.3	0.26
70:00	14.92	220 ml/min.	17.63	2365	1.32	7.14	-25.4	0.34
75:00								
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105:00								
110:00								
115:00								
120:00								

Sampling Time: 1426-1525

Samples Collected: Analysis Requested: Preservative: Holding Time: Lab:

MLW-30S TRITIUM GAMMA NONE
MS01-MLW-30S TRITIUM GAMMA NONE
MSD01-MLW-30S TRITIUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTU.

Site Name: Davis Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW-30D
 Date: 10-9-07
 Sampling Personnel: Go Muddock, CI MOBILITY
 Weather Conditions: 64° partly sunny, winds NW @ 8mph
 Time: 0944 - 0931
 File Name: DB30D

Total Depth (I.D.): 81.24' Screen Length: 70'
 Depth to Water (D.T.W.): 14.84' Well Diameter: 3"
 Total Volume Purged: 1.8 gal Casing Type: PVC
 Purge Rate: 152 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below MLP): 70' color: clean odor: strong

15:72

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	15.19	180 ml/min.	16.93	33950	4.36	6.78	-327.9	1.18
5:00	15.48	170 ml/min.	16.80	36890	0.07	6.65	-340.7	0.59
10:00	16.78	1123 ml/min.	16.78	38960	2.38	6.61	-340.9	0.33
15:00	15.87	1123 ml/min.	16.79	39040	2.83	6.61	-342.4	0.67
20:00	15.94	157 ml/min.	16.78	38980	3.10	6.63	-341.5	0.71
25:00	16.11	140 ml/min.	16.85	38920	7.13	6.60	-348.3	1.09
30:00	16.18	140 ml/min.	16.86	38910	5.71	6.60	-347.3	0.51
35:00	16.22	160 ml/min.	16.84	39110	5.63	6.64	-352.9	0.45
40:00	16.30	145 ml/min.	16.80	38970	5.93	6.65	-354.3	0.86
45:00	16.39	152 ml/min.	16.70	38860	5.84	6.65	-356.2	0.33
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95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 0932-1002

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-30D TRITIUM, GAMMA NONE

Notes

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Davis-Hesse
 Low-Flow Groundwater Sampling Form

Well ID: MW-31D
 Date: 10/8/07
 Sampling Personnel: E.G. Murdock, C.L. Moriarty
 Weather Conditions: 70° sunny, winds E @ 5 mph
 Time: 0835-0913
 File Name: 0031D

Total Depth (I.D.): 81.46' Screen Length: 71'
 Depth to Water (D.T.W.): ⁽¹⁾ 15.6' Well Diameter: 3"
 Total Volume Purged: 1.5 gal Casing Type: PVC
 Purge Rate: 135 ml/min Sampling Device: peristaltic pump
 Tubing Type: polyethylene Measuring Point: top of PVC
 Pump Intake (ft below M.P.): 71' color: clear odor: strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	15.89	210 ml/min.	22.05	20600	2.98	7.12	-311.4	1.54
5:00	16.25	185 ml/min.	21.83	20760	1.73	7.12	-316.5	2.56
10:00	16.59	147 ml/min.	21.91	20700	2.07	7.12	-305.9	1.28
15:00	17.01	180 ml/min.	21.99	20620	2.16	7.09	-312.5	1.94
20:00	17.19	135 ml/min.	22.01	20550	2.07	7.07	-314.1	0.57
25:00	17.33	135 ml/min.	22.13	20410	2.43	7.07	-313.5	0.51
30:00	17.52	140 ml/min.	22.18	20300	2.54	7.06	-311.7	0.59
35:00	17.69	130 ml/min.	22.22	20200	2.58	7.05	-314.0	0.59
40:00	17.82	130 ml/min.	22.27	20110	2.40	7.03	-316.9	0.41
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60:00								
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70:00								
75:00								
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95:00								
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105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 0917 - 0947

Samples Collected: MW-31D Analysis Requested: TRITIUM, GAMMA Preservative: NONE Holding Time: Lab:

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSO
 Low-Flow Groundwater Sampling Form

Well ID: MW 33-S
 Date: 10/5/07
 Sampling Personnel: C. Lamb Merriam, E. G. Murdock
 Weather Conditions: Partly sunny, 70° winds calm, w@0-3mph
 Time: 0841-0935
 File Name: DB33S

Total Depth (I.D.): 42.38' Screen Length: 32'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.38' Well Diameter: 3"
 Total Volume Purged: 3.1 gal Casing Type: PVC
 Purge Rate: 2.15 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 32 color: clear odor: none

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10% 10 mg/L unit	+/-	+/- 10 mV	+/- 10%
0:00	14.39	223 ml/min.	24.96	2332	6.59	7.13	27.2	3.26
5:00	14.39	210 ml/min.	25.24	2350	2.92	7.14	179.9	3.27
10:00	14.39	220 ml/min.	25.71	2355	2.63	7.14	108.6	2.17
15:00	14.39	225 ml/min.	25.45	2362	2.72	7.14	98.6	2.90
20:00	14.39	230 ml/min.	25.40	2360	3.86	7.14	96.8	2.27
25:00	14.40	240 ml/min.	25.46	2359	6.18	7.13	61.6	1.25
30:00	14.39	215 ml/min.	25.46	2356	6.29	7.13	48.6	0.83
35:00	14.39	230 ml/min.	25.44	2353	6.21	7.13	41.7	0.53
40:00	14.40	215 ml/min.	25.46	2350	6.80	7.13	40.7	0.74
45:00	14.40	208 ml/min.	25.43	2341	7.03	7.13	38.9	0.89
50:00	14.40	200 ml/min.	25.41	2332	7.06	7.14	38.7	0.67
55:00	14.39	210 ml/min.	25.50	2325	7.07	7.13	37.0	0.59
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
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Handwritten mark

3.60*

SAMPLE

Sampling Time: 0936 - 0955

Samples Collected: MW-33S Analysis Requested: TRITIUM GAMMA Preservative: NONE Holding Time: Lab:

Notes:
 (1) Do not insert depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) Stabilization criteria based on three most recent consecutive measurements.
 (3) Total drawdown in well to be less than 0.1 m (0.33 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.33 ft).
 (4) -- 10% when turbidity is over 10 NTU.

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-33D

Date: 10/5/07

Sampling Personnel: C. Lamb, Marjanty, E. G. Murdock

Weather Conditions: 78 sunny, hot winds W @ 5mph

Time: 1008-1109

File Name: DB33D

Total Depth (I.D.): 78.98' Screen Length: center 70'

Depth to Water (D.T.W.): (1) 14.58' Well Diameter: 3"

Total Volume Purged: 3.3 gal Casing Type: PVC

Purge Rate: 210 ml/min. Sampling Device: Peristaltic Pump

Tubing Type: Polyethylene Measuring Point: TOP OF PVC

Pump Intake (ft below M.P.): 70' color: clean odor: strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ¹		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	14.73	220 ml/min.	25.51	4825	6.37	6.93	-288.8	1.60
5:00	14.78	235 ml/min.	24.80	5556	2.88	6.93	-341.7	1.18
10:00	14.78	220 ml/min.	24.77	5565	2.13	6.91	-324.5	0.74
15:00	14.79	220 ml/min.	24.62	5554	1.42	6.89	-325.6	0.77
20:00	14.79	220 ml/min.	24.63	5540	1.74	6.88	-328.3	0.59
25:00	14.79	220 ml/min.	24.71	5531	2.20	6.86	-333.1	0.78
30:00	14.79	215 ml/min.	24.74	5866	6.30	6.85	-335.0	0.77
35:00	14.79	218 ml/min.	24.75	6606	6.37	6.83	-340.7	0.44
40:00	14.79	220 ml/min.	24.95	6677	6.15	6.83	-342.5	0.52
45:00	14.80	230 ml/min.	24.75	6679	5.35	6.84	-342.4	0.34
50:00	14.79	200 ml/min.	25.06	6631	5.02	6.84	-337.6	0.31
55:00	14.79	200 ml/min.	25.18	6615	5.06	6.84	-340.3	0.30
60:00	14.79	203 ml/min.	25.19	6600	4.93	6.85	-339.8	0.25
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

B

SAMPLE

Sampling Time: 1110-1133

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-33D TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft)
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MU-355
 Date: 10/31/71
 Sampling Personnel: K. Lamb Mackintosh E.G. MURDOCK
 Weather Conditions: 60° cloudy, drizzle, winds SE @ 5-10mph.
 Time: 0900 - 1000
 File Name: DB355

Total Depth (I.D.): 50.05' Screen Length: 39.5'
 Depth to Water (D.T.W.): ⁽¹⁾ 21.26' Well Diameter: 3"
 Total Volume Purged: ~ 3 gal. Casing Type: PVC
 Purge Rate: 170 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: top of broken PVC
 Pump Intake (ft below M.P.): 39.5' color: None odor: None

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std. units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	21.27	185 ml/min.	19.68	2516	3.32	7.23	49.3	4.52
5:00	21.26	195 ml/min.	19.63	2624	2.45	7.23	54.0	6.70
10:00	21.26	210 ml/min.	19.51	2631	1.04	7.21	53.7	3.41
15:00	21.28	170 ml/min.	19.44	2632	2.27	7.20	52.1	1.20
20:00	21.28	170 ml/min.	19.38	2632	3.18	7.20	51.0	2.48
25:00	21.28	170 ml/min.	19.34	2647	3.38	7.20	46.4	2.49
30:00	21.28	170 ml/min.	19.24	2771	1.60	7.20	-6.1	0.74
35:00	21.28	170 ml/min.	19.14	2806	3.08	7.20	-32.0	0.60
40:00	21.28	170 ml/min.	19.10	2821	3.28	7.21	-40.4	0.91
45:00	21.28	180 ml/min.	19.10	2810	3.04	7.21	-45.9	0.91
50:00	21.28	170 ml/min.	19.13	2803	2.94	7.21	-49.1	0.48
55:00	21.28	165 ml/min.	19.12	2789	3.18	7.21	-49.9	0.61
60:00	21.28	170 ml/min.	19.10	2776	3.24	7.21	-50.1	0.62
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1002 - 1026

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MU-355 TRITUM, GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSZ
 Low-Flow Groundwater Sampling Form

Well ID: MW-35D

Date: 10/3/07

Sampling Personnel: C. Lamb Maricopa, E. G. Murdock

Weather Conditions: Partly sunny, 71° winds

Time: 1053 - 1233

File Name: DB35D

Total Depth (I.D.): 86.63' Screen Length: 76.5'
 Depth to Water (D.T.W.): 20.60' Well Diameter: 3"
 Total Volume Purged: 4 gal Casing Type: PVC
 Purge Rate: 170 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 76.5' color: clear odor: slight yes

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	21.34	170 ml/min.	18.78	6462	2.72	7.00	65.0	1.21
5:00	21.60	180 ml/min.	18.66	6759	3.10	7.00	66.3	2.70
10:00	22.08	165 ml/min.	18.69	6765	3.34	7.02	65.3	1.27
15:00	22.22	165 ml/min.	18.65	6771	2.92	7.02	65.3	1.31
20:00	22.47	170 ml/min.	18.63	6777	3.49	7.03	64.1	1.51
25:00	22.74	170 ml/min.	18.52	6783	3.57	7.03	63.7	1.93
30:00	22.80	170 ml/min.	18.48	6786	3.34	7.04	64.4	1.67
35:00	22.88	170 ml/min.	18.48	6789	1.32	7.04	63.7	1.07
40:00	22.96	170 ml/min.	18.43	6797	1.98	7.05	62.9	1.63
45:00	23.02	170 ml/min.	18.38	6793	1.55	7.07	-82.2	1.10
50:00	23.10	170 ml/min.	18.37	6773	1.24	7.22	-187.6	1.87
55:00	23.15	170 ml/min.	18.31	6685	1.29	7.29	-242.0	0.75
60:00	23.23	170 ml/min.	18.31	6667	1.30	7.29	-279.4	0.87
65:00	23.32	170 ml/min.	18.32	6624	1.32	7.36	-281.1	0.84
70:00	23.35	173 ml/min.	18.30	6595	1.77	7.23	-289.9	0.77
75:00	23.37	170 ml/min.	18.32	6626	1.58	7.21	-293.9	0.91
80:00	23.44	170 ml/min.	18.35	6592	1.67	7.20	-288.5	0.74
85:00	23.47	170 ml/min.	18.31	6581	1.59	7.17	-287.2	0.68
90:00	23.49	175 ml/min.	18.38	6588	1.70	7.16	-285.7	0.83
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

B

3.37*

SAMPLE

Sampling Time: 1235 - 1300

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-35D TRITIUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: Daub Besse
 Low-Flow Groundwater Sampling Form

Well ID: MW 37S

Date: 10-2-07

Sampling Personnel: EGMURDOCK, CL MORIARITY

Weather Conditions: 14° shady, winds NW @ 15 mph

Time: 1037-1206

File Name: DA37S

Total Depth (I.D.): 42.82 ft Screen Length: center 32.5'

Depth to Water (D.T.W.): ⁽¹⁾ 14.09' Well Diameter: 3"

Total Volume Purged: ≈ 5 gal Casing Type: PVC

Purge Rate: 210 ml/min. Sampling Device: Peristaltic Pump

Tubing Type: Polyethylene Measuring Point: Top of PVC

Pump Intake (ft below M.P.): 32.5' color: yellow odor: none

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.14	215 ml/min.	15.81	2228	6.03	7.22	-137.0	0.48
5:00	14.14	215 ml/min.	15.47	2234	3.26	7.26	-150.4	0.36
10:00	14.14	215 ml/min.	15.24	2235	2.30	7.20	-163.2	0.26
15:00	14.14	223 ml/min.	15.23	2234	2.36	7.28	-167.3	0.20
20:00	14.14	215 ml/min.	15.23	2234	2.03	7.21	-168.9	0.40
25:00	14.14	215 ml/min.	15.23	2236	1.74	7.29	-166.9	2.60
30:00	14.14	220 ml/min.	15.15	2240	1.37	7.22	-170.7	2.88
35:00	14.14	210 ml/min.	15.22	2237	1.55	7.27	-165.4	2.56
40:00	14.14	220 ml/min.	15.23	2236	1.35	7.20	-168.1	2.02
45:00	14.14	215 ml/min.	15.26	2238	1.46	7.19	-165.8	1.08
50:00	14.14	215 ml/min.	15.20	2238	1.27	7.25	-174.2	1.61
55:00	14.14	213 ml/min.	15.22	2236	1.26	7.32	-147.0	1.89
60:00	14.14	202 ml/min.	15.19	2237	1.27	7.27	-153.3	1.44
65:00	14.14	200 ml/min.	15.18	2235	1.32	7.24	-187.9	1.32
70:00	14.14	210 ml/min.	15.19	2235	1.15	7.31	-195.6	0.67
75:00	14.14	213 ml/min.	15.13	2237	1.11	7.28	-190.0	0.86
80:00	14.14	220 ml/min.	15.22	2232	1.12	7.26	-190.4	0.93
85:00	14.14	210 ml/min.	15.17	2235	1.13	7.30	-188.0	0.35
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1209-1229

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-37S TRITIUM GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS HESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-100B

Date: 9/25/07

Sampling Personnel: J. Lamb, M. Merriam, A.M. Porewal

Weather Conditions: 84° hot, calm, sunny, wind SW @ 10mph

Time: 1126-1230

File Name: DB100B

Total Depth (I.D.): 44.72' Screen Length: 39.5'

Depth to Water (D.T.W.): ⁽¹⁾ 12.8' Well Diameter: 2"

Total Volume Purged: 300L Casing Type: PVC

Purge Rate: 170 mL/min Sampling Device: Peristaltic Pump

Tubing Type: Polyethylene Measuring Point: TOP OF PVC

Pump Intake (ft below M.P.): 39.5' color: clear odor: none

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	12.85	242 ml/min	16.74	2733	3.04	7.22	-189.1	1.05
5:00	12.83	152 ml/min	16.98	2738	3.58	7.19	-198.6	2.82
10:00	12.83	154 ml/min	17.18	2759	5.40	7.13	-196.3	3.18
15:00	12.83	172 ml/min	17.09	2774	6.63	7.24	-194.7	2.65
20:00	12.83	173 ml/min	17.12	2775	7.36	7.22	-193.6	3.19
25:00	12.83	174 ml/min	16.99	2770	7.36	7.07	-192.5	3.04
30:00	12.83	170 ml/min	17.03	2766	9.46	7.07	-190.7	3.13
35:00	12.83	181 ml/min	16.92	2763	9.98	7.13	-201.7	1.23
40:00	12.83	154 ml/min	16.96	2754	10.27	7.11	-206.8	2.50
45:00	12.83	162 ml/min	17.18	2763	12.90	7.20	-204.8	1.50
50:00	12.83	160 ml/min	17.19	2753	13.03	7.10	-211.1	1.83
55:00	12.83	158 ml/min	17.09	2760	13.48	7.19	-211.2	1.37
60:00	12.83	162 ml/min	17.38	2746	13.13	7.10	-219.2	1.24
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1236 - 1300

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-100B TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-100C
 Date: 9/25/07
 Sampling Personnel: C. Lopez, M. Garcia, A.M. Percival
 Weather Conditions: 74° cloudy, winds SW @ 5 mph
 Time: 0830 - 1030
 File Name: DB100C

Total Depth (I.D.): 84.95' Screen Length: Center 79.5'
 Depth to Water (D.T.W.): ⁽¹⁾ 12.71 Well Diameter: 2"
 Total Volume Purged: 5.5 gal Casing Type: PVC
 Purge Rate: 180 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 79.5' color: clear odor: strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	12.74	214 ml/min	15.98	8775	2.08	7.21	283.2	0.74
5:00	12.76	224 ml/min	16.16	9336	2.39	7.37	-276.7	1.37
10:00	12.75	220 ml/min	16.16	9335	1.91	7.52	-307.1	1.48
15:00	12.75	214 ml/min	16.12	9300	2.53	7.40	-314.2	1.08
20:00	12.76	224 ml/min	15.77	11340	1.89	7.36	-319.3	0.67
25:00	12.76	225 ml/min	15.83	12450	7.84	7.26	-322.4	0.66
30:00	12.76	228 ml/min	15.92	12870	8.61	7.26	-327.3	0.40
35:00	12.76	218 ml/min	15.83	12470	9.71	7.38	-329.3	0.57
40:00	12.76	222 ml/min	15.87	11890	8.30	7.36	-328.0	1.30
45:00	12.76	234 ml/min	15.85	11380	4.66	7.42	-325.7	1.30
50:00	12.76	188 ml/min	16.11	10750	8.29	7.27	-327.7	0.39
55:00	12.76	212 ml/min	16.20	10370	4.71	7.24	-322.4	0.61
60:00	12.76	174 ml/min	16.36	10120	5.01	7.39	-326.5	0.23
65:00	12.74	166 ml/min	16.60	9767	3.90	7.22	-325.0	1.34
70:00	12.74	172 ml/min	16.56	9543	2.93	7.26	-326.1	1.15
75:00	12.74	168 ml/min	16.74	9458	2.09	7.34	-326.6	1.10
80:00	12.74	170 ml/min	16.60	9358	1.98	7.32	-327.0	1.30
85:00	12.74	170 ml/min	16.55	9186	2.08	7.34	-324.7	1.43
90:00	12.74	168 ml/min	16.88	9123	1.96	7.39	-326.0	1.32
95:00	12.74	170 ml/min	16.80	9023	1.55	7.38	-322.4	1.59
100:00	12.74	172 ml/min	16.71	8984	1.59	7.38	-323.0	0.98
105:00	12.74	172 ml/min	16.81	8900	1.55	7.37	-324.6	1.69
110:00	12.74	172 ml/min	16.85	8883	1.58	7.30	-322.1	1.01
115:00								
120:00								

clear 9/25/07 SAMPLE

SAMPLE

Sampling Time: 1023 - 1106

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-100C TRITIUM GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft)
- (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-101A
 Date: 10/2/07
 Sampling Personnel: C. Lamb Moriarty, E.G. Murdock
 Weather Conditions: 62° winds NE @ 3 mph, cloudy
 Time: 0839-1000
 File Name: DB101A

Total Depth (I.D.): 30.66' ^{center} Screen Length: 22.50'
 Depth to Water (D.T.W.): ⁽¹⁾ 15.29' Well Diameter: 2"
 Total Volume Purged: 3.5 gal Casing Type: PVC
 Purge Rate: 172 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 22.50' color: clear odor: None

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	15.48	166 ml/min.	14.62	1252	2.51	6.68	98.8	4.22
5:00	15.48	196 ml/min.	14.36	1264	2.69	6.69	99.3	1.31
10:00	15.49	190 ml/min.	13.99	1257	2.49	6.69	96.1	1.97
15:00	15.49	178 ml/min.	13.99	1255	2.65	6.68	82.4	4.18
20:00	15.48	162 ml/min.	14.03	1254	2.31	6.69	62.7	2.83
25:00	15.48	178 ml/min.	14.07	1254	2.17	6.69	58.6	2.85
30:00	15.49	176 ml/min.	14.10	1255	2.19	6.69	43.4	2.56
35:00	15.49	180 ml/min.	14.13	1255	2.47	6.69	35.6	1.71
40:00	15.50	178 ml/min.	14.06	1257	2.84	6.68	37.4	2.33
45:00	15.50	178 ml/min.	13.98	1331	2.93	6.68	12.3	2.60
50:00	15.51	184 ml/min.	13.95	1608	2.41	6.67	3.4	1.95
55:00	15.50	180 ml/min.	14.07	17041	2.34	6.67	-2.4	1.01
60:00	15.51	180 ml/min.	14.04	1890	2.01	6.69	-6.7	0.62
65:00	15.51	178 ml/min.	14.09	1943	1.99	6.71	-7.4	0.71
70:00	15.52	170 ml/min.	14.13	1961	1.92	6.73	-6.5	0.67
75:00	15.52	168 ml/min.	14.19	1974	1.93	6.75	-5.1	0.62
80:00	15.52	172 ml/min.	14.14	1980	2.07	6.75	-3.6	0.39
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1001-1023

Samples Collected: MW-101A Analysis Requested: TRITIUM, GAMMA Preservative: NONE Holding Time: Lab:

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabalization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-101B
 Date: 10/2/07
 Sampling Personnel: E. Lamb, Maricela E. G. Murillo 6
 Weather Conditions: 65° Cloudy, Winds N @ 3-5 mph
 Time: 1049-1126
 File Name: DB101B

Total Depth (I.D.): 46.71' Screen Length: 39.5'
 Depth to Water (D.T.W.): ⁽¹⁾ 14.07' Well Diameter: 2"
 Total Volume Purged: 1.7 gal Casing Type: PVC
 Purge Rate: 180 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 39.5' color: clear odor:

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	14.13	161 ml/min.	14.87	2024	3.68	7.23	18.1	1.96
5:00	14.14	178 ml/min.	14.52	2075	2.81	7.24	5.9	2.97
10:00	14.13	180 ml/min.	14.53	2077	2.87	7.25	3.0	3.37
15:00	14.13	170 ml/min.	14.42	2088	3.11	7.26	9.6	2.70
20:00	14.13	172 ml/min.	14.45	2091	2.95	7.26	13.6	2.94
25:00	14.13	172 ml/min.	14.44	2094	2.87	7.25	15.3	3.12
30:00	14.13	176 ml/min.	14.47	2093	2.89	7.25	22.5	3.10
35:00	14.13	180 ml/min.	14.58	2091	3.08	7.25	15.1	2.94
40:00								
45:00								
50:00								
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 1129-1149

Samples Collected: MW-101B Analysis Requested: TRITIUM, GAMMA Preservative: NONE Holding Time: Lab:

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS MESS
 Low-Flow Groundwater Sampling Form

Well ID: MW-102A

Date: 4/25/00

Sampling Personnel: C. Lewis, M. Maricarity, A.M. Hernandez

Weather Conditions: 87° Sunny, 10E, winds SW @ 12 mph

Time: 1326-1452

File Name: DB102A

Total Depth (I.D.): 29.15' Screen Length: 24.0'

Depth to Water (D.T.W.): ⁽¹⁾ 13.56' Well Diameter: 2"

Total Volume Purged: 3.5 gal Casing Type: PVC

Purge Rate: 130 ml/min Sampling Device: Peristaltic Pump

Tubing Type: Pellethane Measuring Point: Top of PVC

Pump Intake (ft below M.P.): 24.0 color: clear odor: slight-very

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria*	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	13.56	240 ml/min	17.77	2087	13.25	6.67	-74.0	37.7
5:00	14.60	153 ml/min	18.26	2850	11.24	6.66	-96.0	33.4
10:00	14.65	160 ml/min	18.18	2693	14.60	6.67	-98.9	46.7
15:00	14.79	160 ml/min	18.25	2698	17.26	6.67	-102.1	57.7
20:00	14.95	154 ml/min	17.98	2696	21.28	6.71	-110.1	60.6
25:00	15.16	155 ml/min	17.99	2686	17.96	6.78	-138.1	57.5
30:00	15.35	148 ml/min	17.86	2681	21.43	6.81	-149.0	54.6
35:00	15.35	129 ml/min	18.30	2662	18.95	6.80	-149.6	29.4
40:00	15.34	124 ml/min	18.24	2673	23.62	6.86	-165.9	31.9
45:00	15.34	123 ml/min	18.19	2663	21.90	6.87	-169.1	23.0
50:00	15.34	126 ml/min	18.35	2665	21.58	6.87	-175.0	21.2
55:00	15.34	133 ml/min	18.07	2658	21.43	6.89	-189.9	14.7
60:00	15.34	129 ml/min	17.78	2646	19.14	6.89	-186.6	15.0
65:00	15.34	118 ml/min	18.16	2640	19.71	6.89	-187.9	12.4
70:00	15.29	124 ml/min	18.40	2641	25.23	6.90	-187.0	12.4
75:00	15.16	146 ml/min	18.20	2657	25.84	6.92	-189.9	13.1
80:00	15.24	137 ml/min	18.20	2637	25.52	6.91	-191.0	12.1
85:00	15.31	130 ml/min	18.05	2635	25.07	6.91	-190.6	
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1453-1521

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-102A TRITIUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-102B
 Date: 9/27/07
 Sampling Personnel: D. Lamb, M. Morante, A.M. Perreault
 Weather Conditions: 60° cloudy, winds NW @ 3 mph
 Time: 0836-1036
 File Name: D6102B

Total Depth (I.D.): 42.99' Screen Length: 38.5'
 Depth to Water (D.T.W.): 11.78' Well Diameter: 2"
 Total Volume Purged: 96 gal Casing Type: PVC
 Purge Rate: 175 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 39.5' color: Clean odor: Yes

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	11.82	266 ml/min.	15.45	2453	2.57	8.14	-185.1	2.01
5:00	11.82	190 ml/min.	15.43	2513	2.23	7.31	-191.8	2.06
10:00	11.82	197 ml/min.	15.48	2519	2.56	7.22	-198.8	3.82
15:00	11.82	198 ml/min.	15.46	2524	2.10	7.20	-205.8	3.27
20:00	11.82	204 ml/min.	15.49	2525	2.40	7.20	-201.8	3.03
25:00	11.82	200 ml/min.	15.30	2525	2.17	7.21	-205.2	2.43
30:00	11.82	198 ml/min.	15.36	2522	2.15	7.21	-206.1	2.23
35:00	11.82	200 ml/min.	15.34	2520	2.25	7.21	-208.0	1.90
40:00	11.82	193 ml/min.	15.34	2514	2.26	7.21	-162.8	1.76
45:00	11.82	198 ml/min.	15.48	2512	2.44	7.21	-156.0	1.65
50:00	11.82	190 ml/min.	15.32	2513	2.44	7.22	-177.8	1.32
55:00	11.82	189 ml/min.	15.24	2511	2.43	7.21	-168.1	1.37
60:00	11.82	198 ml/min.	15.22	2508	2.62	7.22	-164.8	1.40
65:00	11.82	170 ml/min.	15.34	2502	2.96	7.22	-164.0	1.72
70:00	11.82	175 ml/min.	15.44	2494	2.69	7.21	-171.6	1.69
75:00	11.82	170 ml/min.	15.43	2494	2.72	7.21	-172.5	1.06
80:00	11.82	170 ml/min.	15.46	2494	2.74	7.21	-178.9	1.56
85:00	11.82	170 ml/min.	15.52	2490	2.78	7.21	-186.7	0.86
90:00	11.82	166 ml/min.	15.55	2496	4.05	7.21	-192.4	1.54
95:00	11.83	164 ml/min.	15.60	2492	3.93	7.21	-194.6	0.98
100:00	11.82	168 ml/min.	15.60	2490	3.69	7.21	-202.4	1.26
105:00	11.82	174 ml/min.	15.71	2489	3.58	7.21	-207.8	0.96
110:00	11.82	174 ml/min.	15.43	2487	3.45	7.21	-210.3	1.00
115:00	11.82	174 ml/min.	15.42	2484	3.36	7.20	-214.3	0.98
120:00	11.82	175 ml/min.	15.49	2482	3.47	7.21	-213.2	1.30

B

SAMPLE

Sampling Time: 1037-1059

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW 102B TRITILUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVE BEESE
 Low-Flow Groundwater Sampling Form

Well ID: MW-102C
 Date: 9/27/07
 Sampling Personnel: J.C. Lamb, Marjarity, Am. Percival
 Weather Conditions:
 Time: 0715-1115-1439
 File Name: DB102C

6

Total Depth (I.D.): 77.14' Screen Length: 72.50'
 Depth to Water (D.T.W.): ⁽¹⁾ 18.45' Well Diameter: 2"
 Total Volume Purged: 5.5 gal Casing Type: PVC
 Purge Rate: 188 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 72.50' color: yellow, odor: very strong

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00		130 ml/min.	16.39	142,700	0.61	6.76	-355.3	16.9
5:00	18.45	137 ml/min.	16.35	142,600	2.39	6.72	-341.6	111
10:00	18.53	137 ml/min.	16.30	142,100	3.81	6.72	-353.0	10.5
15:00		124 ml/min.	16.30	142,000	5.08	6.72	-360.2	98.2
20:00	24.02	122 ml/min.	16.51	141,700	5.50	6.72	-360.8	84.7
25:00	24.08	98 ml/min.	16.44	141,700	5.90	6.72	-362.4	63.9
30:00	24.31	100 ml/min.	16.60	141,800	5.50	6.73	-359.6	71.7
35:00	24.53	98 ml/min.	16.70	141,700	6.27	6.72	-359.8	62.5
40:00	24.97	98 ml/min.	16.79	141,500	6.39	6.73	-361.4	78.5
45:00	25.30	88 ml/min.	16.95	141,800	5.43	6.72	-363.3	73.5
50:00	25.30	80 ml/min.	17.30	141,700	6.41	6.72	-363.3	57.5
55:00	25.30	64 ml/min.	17.63	141,600	5.94	6.73	-364.1	19.3
60:00	23.20	68 ml/min.	17.84	141,900	8.90	6.73	-362.4	23.6
65:00	25.40	68 ml/min.	17.94	141,800	8.25	6.72	-363.4	7.91
70:00	25.50	58 ml/min.	18.49	141,600	5.20	6.74	-363.2	25.0
75:00	23.3	98 ml/min.	17.50	137,000	12.03	6.79	-360.9	30.3
80:00	23.52	160 ml/min.	17.18	139,200	7.95	6.75	-361.4	39.4
85:00	24.52	156 ml/min.	16.25	142,300	7.02	6.73	-362.3	52.1
90:00	25.13	154 ml/min.	16.02	142,300	6.78	6.73	-364.0	38.3
95:00	25.55	150 ml/min.	15.86	142,600	6.30	6.73	-363.4	42.5
100:00	24.95	190 ml/min.	15.62	142,300	6.27	6.73	-364.3	36.8
105:00	25.17	210 ml/min.	15.32	142,700	6.37	6.73	-363.7	37.8
110:00	27.20	212 ml/min.	15.55	142,400	6.26	6.73	-364.8	31.3
115:00	27.70	216 ml/min.	15.56	142,400	6.32	6.74	-364.0	16.9
120:00	27.53	224 ml/min.	15.21	142,000	6.43	6.74	-364.8	16.4

with pump installed

Sampling Time: 1440-1505

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-102C TRITIUM GAMMA NONE

* see lay

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

1 of 2

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MLD-102C
 Date: 9/27/07
 Sampling Personnel: C. Lamb Moriarty, A.M. Percival
 Weather Conditions: 67° sunny winds NE @ 3 mph.
 Time: See page 1 of 2
 File Name: DB102C

6

Total Depth (I.D.): _____ Screen Length: center
 Depth to Water (D.T.W.): ⁽¹⁾ _____ Well Diameter: _____
 Total Volume Purged: _____ Casing Type: _____
 Purge Rate: _____ Sampling Device: _____
 Tubing Type: _____ Measuring Point: _____
 Pump Intake (ft below M.P.): _____ color: _____ odor: _____

see Page 1 of 2

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	28.4	175 ml/min	15.51	141,200	6.45	6.74	-366.0	13.9
5:00	27.6	214 ml/min	16.01	144,100	6.45	6.75	-366.0	13.1
10:00	29.01	200 ml/min	15.78	140,900	6.62	6.76	-365.4	13.5
15:00	27.60	196 ml/min	15.78	140,800	6.77	6.76	-366.1	11.7
20:00	29.52	213 ml/min	15.61	140,900	6.63	6.76	-364.9	12.4
25:00	30.19	150 ml/min	15.55	140,300	6.68	6.76	-364.8	11.5
30:00	29.30	155 ml/min	16.15	139,500	6.55	6.77	-367.2	11.0
35:00	30.61	192 ml/min	15.87	140,700	6.79	6.77	-367.5	10.8
40:00	30.91	193 ml/min	16.06	139,800	6.77	6.78	-368.1	10.3
45:00	31.30	192 ml/min	16.26	139,900	6.68	6.79	-368.2	10.4
50:00	31.95	198 ml/min	16.06	140,700	6.90	6.80	-368.2	10.14
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 1440

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

See page 1 of 2

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

2 of 2

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-103A
 Date: 10/1/07
 Sampling Personnel: V. Larch, Marjorie, E.G. MURDOCK
 Weather Conditions: 107° Cloudy, winds 3 to 9 mph
 Time: 0833-1005
 File Name: DB103A

B

Total Depth (I.D.): 37.67' ^{water} Screen Length: 33.75'
 Depth to Water (D.T.W.): ⁽¹⁾ 17.20' Well Diameter: 2"
 Total Volume Purged: 4.5 gal Casing Type: PVC
 Purge Rate: 17.5 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below MLP): 33.75' color: None odor: None

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NIU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10%
0:00	17.43	216 ml/min.	14.60	2548	2.32	7.02	-86.2	1.89
5:00	17.48	174 ml/min.	14.47	2560	2.08	7.01	-118.6	5.72
10:00	17.50	160 ml/min.	14.45	2538	1.98	7.03	-120.8	3.40
15:00	17.52	188 ml/min.	14.37	2553	1.65	7.04	-124.3	2.95
20:00	17.53	184 ml/min.	14.34	2546	1.67	7.04	-122.6	2.07
25:00	17.57	176 ml/min.	14.43	2519	1.52	7.04	-119.2	3.08
30:00	17.57	178 ml/min.	14.47	2513	1.50	7.05	-118.3	1.76
35:00	17.54	178 ml/min.	14.52	2505	1.39	7.05	-136.4	2.04
40:00	17.55	176 ml/min.	14.38	2499	1.31	7.05	-153.7	4.27
45:00	17.55	176 ml/min.	14.52	2483	1.54	7.05	-117.8	3.63
50:00	17.55	174 ml/min.	14.53	2481	1.63	7.05	-112.7	1.94
55:00	17.55	174 ml/min.	14.63	2473	1.73	7.05	-176.3	2.44
60:00	17.55	182 ml/min.	14.67	2462	1.74	7.05	-190.5	3.82
65:00	17.55	172 ml/min.	14.64	2455	1.79	7.05	-182.0	4.54
70:00	17.56	170 ml/min.	14.76	2449	1.80	7.05	-173.3	1.98
75:00	17.54	174 ml/min.	14.86	2445	1.83	7.05	-179.4	1.92
80:00	17.54	174 ml/min.	14.91	2436	1.88	7.05	-189.3	1.28
85:00	17.53	178 ml/min.	15.00	2429	1.98	7.05	-191.8	1.35
90:00	17.55	180 ml/min.	14.89	2426	1.99	7.05	-199.1	1.10
95:00	17.53	192 ml/min.	15.08	2421	1.92	7.05	-195.5	1.77
100:00								
105:00								
110:00								
115:00								
120:00								

SAMPLE

Sampling Time: 1008-1031

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-103A TRITIUM GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-103B
 Date: 10/1/07
 Sampling Personnel: J. Lamb, M. Narity, E.G. Murdock
 Weather Conditions: 47° hard rain, cloudy, winds SE 9 mph.
 Time: 1043-1150
 File Name: FATJ DB103B
 Total Depth (T.D.): 101107 Screen Length: 43'
 Depth to Water (D.T.W.): ⁽¹⁾ 16.42' Well Diameter: 2"
 Total Volume Purged: 3.3 gal Casing Type: PVC
 Purge Rate: 175 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 43 color: Clear odor: Slight

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
0:00	16.48	240 ml/min.	14.94	2377	5.83	7.26	-189.0	4.49
5:00	16.48	140 ml/min.	15.22	2414	3.44	7.23	-211.9	6.26
10:00	16.48	166 ml/min.	15.08	2454	2.81	7.22	-215.0	2.15
15:00	16.49	174 ml/min.	14.79	2464	2.68	7.22	-221.4	2.47
20:00	16.49	176 ml/min.	14.73	2462	3.22	7.23	-211.7	2.25
25:00	16.49	172 ml/min.	14.75	2460	3.05	7.23	-231.4	3.36
30:00	16.49	174 ml/min.	14.70	2460	2.98	7.23	-215.6	2.08
35:00	16.49	174 ml/min.	14.87	2457	2.88	7.23	-229.1	1.34
40:00	16.49	180 ml/min.	14.63	2459	2.94	7.22	-239.5	1.33
45:00	16.49	180 ml/min.	14.28	2457	2.77	7.21	-247.1	1.60
50:00	16.49	220 ml/min.	14.19	2460	2.84	7.21	-249.7	1.58
55:00	16.49	182 ml/min.	14.09	2459	2.84	7.20	-252.7	1.22
60:00	16.49	172 ml/min.	14.06	2459	2.86	7.20	-246.6	1.21
65:00	16.49	175 ml/min.	14.06	2453	2.87	7.19	-247.5	1.25
70:00	16.48	172 ml/min.	14.05	2453	2.88	7.20	-257.9	1.17
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1152-1230

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

GWY 10/1/07
FATJ-103B
MW-103B TRITIUM GAMMA NONE
DBD-04 TRITIUM GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft)
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS BESSÉ
 Low-Flow Groundwater Sampling Form

Well ID: MW-103C
 Date: 10/1/07
 Sampling Personnel:
 Weather Conditions:
 Time: 1244
 File Name: DB103C

Total Depth (I.D.): _____ Screen Length: center 72.5'
 Depth to Water (D.T.W.): ⁽¹⁾ 68.58' Well Diameter: 2"
 Total Volume Purged: 3 gal. Casing Type:
 Purge Rate: _____ Sampling Device: Bladder/Boiled
 Tubing Type: Polyethylene Measuring Point: TOP OF PVC
 Pump Intake (ft below M.P.): 72.5' color: _____ odor: _____

80.32

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	<u>70.5</u>	<u>146 ml/min</u>	<u>13.77</u>	<u>121,500</u>	<u>2.23</u>	<u>6.80</u>	<u>-233.7</u>	<u>9.05</u>
5:00		<u>150 ml/min</u>	<u>13.81</u>	<u>121,100</u>	<u>2.40</u>	<u>6.81</u>	<u>-243.2</u>	<u>14.9</u>
10:00		<u>162 ml/min</u>	<u>14.04</u>	<u>126,800</u>	<u>1.32</u>	<u>6.82</u>	<u>-240.6</u>	<u>14.39</u>
15:00	<u>70.62</u>	<u>92 ml/min</u>	<u>14.07</u>	<u>120,800</u>	<u>1.18</u>	<u>6.81</u>	<u>-243.9</u>	<u>13.62</u>
20:00	<u>70.61</u>	<u>99 ml/min</u>	<u>14.12</u>	<u>130,200</u>	<u>1.01</u>	<u>6.81</u>	<u>-246.7</u>	<u>9.62</u>
25:00		<u>65 ml/min</u>	<u>14.26</u>	<u>121,900</u>	<u>1.58</u>	<u>6.81</u>	<u>-253.0</u>	<u>6.50</u>
30:00			<u>14.47</u>	<u>121,000</u>	<u>0.70</u>	<u>6.80</u>	<u>-256.6</u>	<u>5.88</u>
35:00		<u>107 ml/min</u>	<u>14</u>	<u>121,000</u>	<u>0.92</u>	<u>6.80</u>	<u>-258.7</u>	<u>9.58</u>
40:00		<u>Flow 15 ml/min for 10 min.</u>						
45:00		<u>DRY @ 3 gal/s</u>						
50:00								
55:00								
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

3 vol = 5.74 gal

Sampling Time: _____

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS-BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW104A
 Date: 9/23/07
 Sampling Personnel: CL Merriarty, A.M. Percival
 Weather Conditions: sunny, 52°F, winds West @ 4 mph
 Time: 0835-0947
 File Name: DB104A

Total Depth (I.D.): 31.76' ^{unc. 9.5 ft} Screen Length: 26.5' ^{center}
 Depth to Water (D.T.W.): 13.70' ⁽¹⁾ 12.90' Well Diameter: 2"
 Total Volume Purged: 4 gal Casing Type: PVC
 Purge Rate: 212 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 26.5' color: clear odor: slight

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabalization Criteria ²	(see note below) ²		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	13.11	230 ml/min.	14.27	2390	5.30	6.81	-68.4	2.72
5:00	13.12	210 ml/min.	14.07	2409	5.01	6.88	-78.2	2.13
10:00	13.12	210 ml/min.	13.90	2444	5.88	6.99	-93.9	3.00
15:00	13.12	209 ml/min.	13.68	2520	6.71	6.91	-103.7	7.65
20:00	13.12	207 ml/min.	13.78	2542	6.34	6.88	-93.3	5.79
25:00	13.12	208 ml/min.	14.18	2543	6.74	6.86	-90.7	4.50
30:00	13.13	212 ml/min.	14.13	2539	7.11	6.86	-92.2	4.05
35:00	13.13	218 ml/min.	14.00	2530	7.73	6.86	-93.4	4.30
40:00	13.13	201 ml/min.	14.25	2515	7.98	6.86	-101.7	4.01
45:00	13.13	203 ml/min.	14.35	2515	8.45	6.86	-108.9	4.99
50:00	13.13	206 ml/min.	14.21	2515	14.53	6.85	-112.0	3.45
55:00	13.13	210 ml/min.	14.14	2517	15.11	6.85	-114.6	2.48
60:00	13.13	210 ml/min.	14.11	2507	15.13	6.85	-110.6	2.88
65:00	13.13	210 ml/min.	14.33	2503	15.07	6.85	-114.8	2.83
70:00	13.13	212 ml/min.	14.09	2506	15.01	6.85	-120.1	2.17
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 0949-1007

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-104A TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabalization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS - BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-104B
 Date: 9/28/07
 Sampling Personnel: C. Lamb Moriarty, A M Percival
 Weather Conditions: 65° winds W @ 11mph sunny
 Time: 1023-1120
 File Name: DB104B

Total Depth (I.D.): 46.32' Screen Length: 40'
 Depth to Water (D.T.W.): ⁽¹⁾ 11.96' Well Diameter: 2"
 Total Volume Purged: 3 gal. Casing Type: PVC
 Purge Rate: 2.11 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 40' color: clear odor: yes

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	12.05	237 ml/min.	14.33	2438	7.08	7.32	-234.3	2.59
5:00	12.07	215 ml/min.	14.53	2454	7.72	7.32	-240.7	6.54
10:00	12.05	224 ml/min.	14.49	2466	8.44	7.30	-256.3	3.38
15:00	12.05	218 ml/min.	14.31	2472	9.30	7.26	-261.0	2.80
20:00	12.04	212 ml/min.	14.35	2469	9.53	7.22	-263.8	3.56
25:00	12.04	204 ml/min.	14.30	2466	10.07	7.17	-276.9	3.47
30:00	12.05	222 ml/min.	14.27	2471	9.64	7.15	-288.8	2.94
35:00	12.05	202 ml/min.	14.36	2467	9.43	7.13	-294.1	2.47
40:00	12.05	202 ml/min.	14.34	2471	9.67	7.12	-285.4	2.43
45:00	12.05	204 ml/min.	14.27	2475	9.59	7.11	-282.1	2.30
50:00	12.05	205 ml/min.	14.28	2472	9.99	7.10	-286.1	2.09
55:00	12.05	211 ml/min.	14.19	2477	9.71	7.09	-287.7	2.38
60:00								
65:00								
70:00								
75:00								
80:00								
85:00								
90:00								
95:00								
100:00								
105:00								
110:00								
115:00								
120:00								

Sampling Time: 1121-1142

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-104B TRITIUM GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-104C
 Date: 9/28/07
 Sampling Personnel: K. Lamb Moriarity A.M. Percival
 Weather Conditions: 70° sunny, winds NW @ 14 mph.
 Time: 1159 Filled @ 1213 = 1414
 File Name: DB104C

Total Depth (I.D.): 77.03' Screen Length: Center 72'
 Depth to Water (D.T.W.): ⁽¹⁾ 31.51 Well Diameter: 2"
 Total Volume Purged: 4 gal Casing Type: PVC
 Purge Rate: 140 ml/min. Sampling Device: Peristaltic Pump
 Tubing Type: Polyethylene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): 72' color: H. tan odor: None

Time (min)	DTW (feet)	Comments	Temp (°C)	SpC (µS/cm)	DO (mg/L)	pH (std units)	ORP (mV)	Turb (NTU)
Stabilization Criteria ²	(see note below) ³		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁴
0:00	32.50	460 ml/min	15.13	18,270	12.22	7.19	-64.7	28.0
5:00	33.35	160 ml/min	15.15	21,470	8.62	7.27	-73.0	121.0
10:00	34.24	154 ml/min	15.76	22,070	6.82	7.29	-80.1	92.2
15:00	34.85	152 ml/min	15.79	22,460	4.56	7.29	-84.2	65.0
20:00	35.40	146 ml/min	16.05	22,520	4.52	7.29	-86.0	48.8
25:00	36.45	140 ml/min	15.23	22,510	5.24	7.28	-85.7	55.6
30:00	37.30	134 ml/min	16.20	21,470	5.34	7.26	-84.9	56.7
35:00	37.72	134 ml/min	16.23	20,950	4.02	7.24	-83.4	52.8
40:00	38.08	130 ml/min	16.56	20,580	4.20	7.23	-83.5	48.0
45:00	38.43	120 ml/min	16.43	20,170	4.01	7.22	-84.2	42.3
50:00	38.90	136 ml/min	16.47	19,780	3.45	7.21	-83.6	32.4
55:00	39.63	180 ml/min	15.74	19,640	4.83	7.20	-83.2	35.7
60:00	40.19	164 ml/min	15.71	19,510	6.47	7.19	-83.1	33.9
65:00	41.06	140 ml/min	15.96	18,820	6.10	7.19	-83.0	28.2
70:00	41.72	160 ml/min	15.61	19,270	6.70	7.18	-82.8	27.4
75:00	42.40	158 ml/min	15.59	20,070	6.62	7.18	-81.6	22.5
80:00	43.03	152 ml/min	16.57	21,300	6.13	7.19	-80.5	21.7
85:00	43.42	152 ml/min	15.37	22,740	6.73	7.20	-79.1	24.8
90:00	43.03	130 ml/min	15.79	22,790	6.56	7.21	-77.2	27.2
95:00	45.29	146 ml/min	16.49	22,400	6.34	7.22	-76.8	29.8
100:00	45.68	144 ml/min	16.26	22,410	6.72	7.23	-72.5	28.5
105:00	46.37	130 ml/min	16.04	22,250	6.85	7.24	-70.3	36.3
110:00	46.78	133 ml/min	16.46	21,590	6.52	7.26	-69.4	38.8
115:00	47.50	142 ml/min	16.32	21,230	6.63	7.27	-70.4	36.1
120:00	47.96	136 ml/min	16.29	21,160	6.72	7.27	-70.4	36.2
125:00	48.32	140 ml/min	16.26	21,160	6.12	7.28	-70.4	38.4

Sampling Time: 1415 - 1442

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

MW-104C TRITIUM, GAMMA NONE

Notes:
 (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
 (2) - Stabilization criteria based on three most recent consecutive measurements.
 (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
 (4) +/- 10% when turbidity is over 10 NTUs.

Site Name: DAVIS BESSE
 Low-Flow Groundwater Sampling Form

Well ID: MW-105A

Date: 10/8/07

Sampling Personnel: K. Lamb, Marjorie E.S. Murdock

Weather Conditions: 85° hot, sunny, winds SE @ 5 mph

Time: 10/6-12/8

File Name: DB105A

Total Depth (I.D.): 27.01' Screen Length: 22.0'
 Depth to Water (D.T.W.): ⁽¹⁾ 13.08' Well Diameter: 2"
 Total Volume Purged: 6,759 gal Casing Type: PVC
 Purge Rate: 2.15 ml/min Sampling Device: Peristaltic Pump
 Tubing Type: Plurithene Measuring Point: Top of PVC
 Pump Intake (ft below M.P.): ⁽²⁾ 22.0' color: clear odor: slight
to v. yr. yellow

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm)	DO (mg/L)	pH std units	ORP mV	Turb NTU
Stabilization Criteria ⁽⁴⁾	(see note below) ⁽³⁾		+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10 mV	+/- 10% ⁽⁴⁾
0:00	13.22	215 ml/min	19.25	2547	4.74	6.84	-113.6	18.7
5:00	13.27	240 ml/min	19.11	2532	2.07	6.84	-127.3	26.4
10:00	13.23	180 ml/min	19.27	2535	2.47	6.85	-126.7	26.3
15:00	13.23	185 ml/min	19.37	2520	2.34	6.87	-135.1	22.6
20:00	13.22	190 ml/min	19.54	2483	2.27	6.88	-143.3	19.6
25:00	13.22	190 ml/min	19.58	2468	2.11	6.89	-115.2	20.8
30:00	13.27	200 ml/min	19.59	2439	2.06	6.90	-113.7	21.2
35:00	13.29	210 ml/min	19.50	2434	1.96	6.91	-114.5	24.0
40:00	13.31	205 ml/min	19.48	2431	1.77	6.91	-112.6	21.7
45:00	13.31	205 ml/min	19.33	2424	1.74	6.91	-116.0	11.9
50:00	13.33	210 ml/min	19.33	2411	1.64	6.92	-111.5	13.5
55:00	13.32	205 ml/min	19.46	2399	1.57	6.93	-117.8	14.1
60:00	13.33	210 ml/min	19.40	2407	1.51	6.92	-126.6	4.5
65:00	13.32	205 ml/min	19.39	2316	1.57	6.92	-120.4	10.5
70:00	13.32	210 ml/min	19.51	2391	1.59	6.93	-120.9	8.75
75:00	13.32	200 ml/min	19.74	2370	1.48	6.93	-117.0	6.86
80:00	13.30	195 ml/min	19.67	2387	1.64	6.93	-122.8	8.07
85:00	13.31	195 ml/min	19.65	2390	1.52	6.92	-124.5	8.12
90:00	13.37	220 ml/min	19.38	2389	1.57	6.92	-127.0	7.04
95:00	13.35	215 ml/min	19.47	2384	1.58	6.92	-123.8	5.61
100:00	13.37	215 ml/min	19.54	2378	1.50	6.93	-113.8	4.65
105:00	13.20	140 ml/min	20.16	2375	1.80	6.94	-112.5	4.33
110:00	13.27	225 ml/min	19.84	2383	1.70	6.93	-110.7	4.42
115:00	13.35	215 ml/min	19.53	2379	1.78	6.93	-118.0	4.09
120:00	13.38	215 ml/min	19.76	2381	1.74	6.93	-108.1	3.78

6

SAMPLE

Sampling Time: 1220-1241

Samples Collected: _____ Analysis Requested: _____ Preservative: _____ Holding Time: _____ Lab: _____

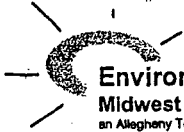
MW-105A TRITIUM, GAMMA NONE

Notes:

- (1) - Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
- (2) - Stabilization criteria based on three most recent consecutive measurements.
- (3) - Total drawdown in well to be less than 0.1 m (0.32 ft). Purging rate to be lowered as necessary to keep drawdown below 0.1 m (0.32 ft).
- (4) +/- 10% when turbidity is over 10 NTUs.

APPENDIX D

Appendix D
Laboratory Analytical Reports



Environmental, Inc.
Midwest Laboratory
 an Allegheny Technologies Co.

700 Landwehr Road • Northbrook, IL 60062-2310
 ph. (847) 584-0700 • fax (847) 584-4517

61

~~Mr. Al Percival~~
~~FirstEnergy Corporation~~
~~Mail Stop 1041~~
 5501 North State Route 2
 Oak Harbor, Ohio 43449

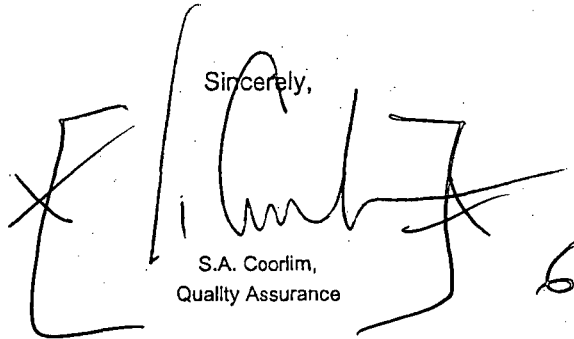
LABORATORY REPORT NO.: 8003-100-362
 DATE: 07-10-07
 SAMPLES RECEIVED: 06-22-07
 PURCHASE ORDER NO.:

Dear Mr. Percival

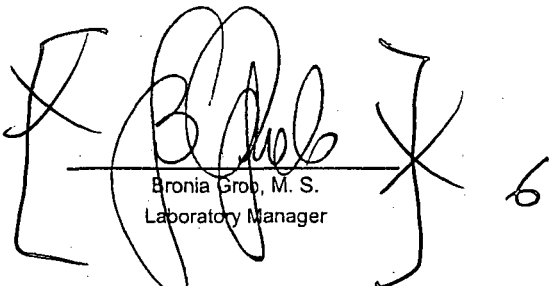
Enclosed are results of the analyses for tritium and gamma-emitting isotopes in five ground water samples, one matrix spike and one matrix spike duplicate.

Should you have any questions or other concerns, please do not hesitate to call.

Sincerely,

 6

S.A. Coorlim,
 Quality Assurance

 6

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 Laboratory Manager

SAMPLES RETAINED THIRTY DAYS AFTER ANALYSIS

Table 1. Results of analyses for tritium and gamma-emitting isotopes in five ground water samples, matrix spike and matrix spike duplicate.

Sample Location	MW-1S	MW-1D	MW-26S	MW-26D	MS01-MW-26D
Date Collected	06-12-07	06-12-07	6/13/2007	6/13/2007	6/13/2007
Time Collected	10:49	13:09	10:17	13:13	13:13
Lab Code	TXW-3910	TXW-3911	TXW-3912	TXW-3913	TXW-3914 ^a
Isotope	Concentration (pCi/L)				
H-3	< 330	< 330	341 ± 101	< 330	5000 ± 208
Mn-54	< 2.1	< 3.3	< 4.1	< 3.3	< 2.0
Fe-59	< 6.4	< 6.2	< 9.0	< 6.1	< 4.1
Co-58	< 3.1	< 2.7	< 5.7	< 3.1	< 2.3
Co-60	< 3.1	< 2.3	< 3.1	< 2.5	< 3.5
Zn-65	< 3.2	< 5.9	< 7.5	< 5.2	< 5.6
Zr-Nb-95	< 2.5	< 3.4	< 5.9	< 3.8	< 2.9
Cs-134	< 2.7	< 3.3	< 3.6	< 2.6	62.9 ± 4.5
Cs-137	< 2.0	< 3.3	< 2.9	< 2.9	64.2 ± 6.9
Ba-La-140	< 3.9	< 4.5	< 5.3	< 3.3	< 3.9

Sample Location	MSD01-MW-26C	MW-7S
Date Collected	6/13/2007	06-13-07
Time Collected	13:13	14:53
Lab Code	TXW-3915 ^a	TXW-3916
Isotope	Concentration (pCi/L)	
H-3	5055 ± 209	426 ± 104
Mn-54	< 3.1	< 3.7
Fe-59	< 6.1	< 5.7
Co-58	< 2.9	< 2.0
Co-60	< 1.4	< 2.7
Zn-65	< 5.9	< 2.7
Zr-Nb-95	< 6.3	< 4.3
Cs-134	59.1 ± 4.5	< 2.9
Cs-137	70.0 ± 6.9	< 3.5
Ba-La-140	< 5.9	< 4.2

The error given is the probable counting error at the 95% confidence level.
Less than (<), value is based on a 4.66 sigma counting error for the background sample.

^a Known spike activity (pCi/L): Cs-134. 59.3 Cs-137. 66.3 H-3, 5639.

TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: Jim
 Date approved: 7-10-07

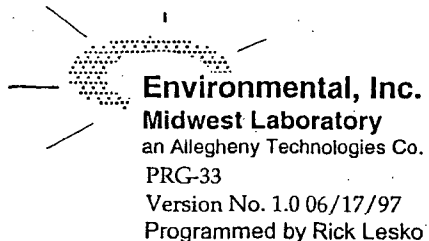
Sample Count Time (min.): 100
 Background Count Time (min.): 200
 Background Counts: 912

Standard Count Time (min.): 200
 Standard Counts: 64469
 Counter Efficiency: 0.205

Date Counted: 6/28/2007
 Calculated by: Rick
 Date Calculated: 7/5/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00		4.66	
					Activity	Error		Sigma	Sigma		
TXW-3910	6/12/2007	13.0	495	0.998	66.176	± 91.250	91.693	108.702	☞	168.851	
TXW-3911	6/12/2007	13.0	465	0.998	15.271	± 89.337	89.361	108.702	☞	168.851	
TXW-3912	6/13/2007	13.0	657	0.998	341.007	± 100.941	111.085	108.685		168.825	
TXW-3913	6/13/2007	13.0	496	0.998	67.862	± 91.299	91.764	108.685	☞	168.825	
TXW-3914	6/13/2007	13.0	447	0.998	-15.269	± 88.156	88.180	108.685	☞	168.825	
TXW-3915	6/13/2007	13.0	481	0.998	42.414	± 90.348	90.532	108.685	☞	168.825	
TXW-3916	6/13/2007	13.0	707	0.998	425.835	± 103.754	118.823	108.685		168.825	

☞ = Best probable result.



TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: SLC
 Date approved: 7-10-09

Sample Count Time (min.): 100
 Background Count Time (min.): 300
 Background Counts: 795

Standard Count Time (min.): 300
 Standard Counts: 85421
 Counter Efficiency: 0.182

Date Counted: 6/30/2007
 Calculated by: Rick
 Date Calculated: 7/5/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00 Sigma	4.66 Sigma
					Activity	± Error			
TXW-3914	6/13/2007	13.0	2881	0.997	4999.840	± 208.295	711.166	93.339	144.986
TXW-3915	6/13/2007	13.0	2910	0.997	5055.267	± 209.309	718.672	93.339	144.986

☞ = Best probable result.

Sample description
TXW-3916 3.5 LITER
13-JUN-2007 14:53 AMS

Sum
7-10-07

Spectrum Filename: C:\User\17403.Ani

Acquisition information

Start time 28-Jun-2007 13:19:15
Live time 8406
Real time 8417
Dead time .13%
Detector/Geometry IDs 1 & 0

Detector system

MCB 1 Input 1

Calibration

Filename: dig1.Clb
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	13-Jun-2007 14:53:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

17-Apr-2007 18:01:50

Observation (Internal) NO

Energy calibration normalized difference: .1125

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
706.55	351.97	130.	93.	7.464E+03	55.09	2.027	PB-214 s
1220.10	609.24	30.	110.	1.275E+04	28.32	1.822	BI-214 s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	271.00	133.78	79.	0.	.000	1777.64	.000s
CE-141	292.09	144.34	332.	71.	.008	105.36	.783s
I-131	571.35	284.24	89.	4.	.000	674.54	1.252
BA-140	614.94	306.08	102.	31.	.004	122.82	1.314
LA-140	660.07	328.69	58.	5.	.001	432.60	.443s
I-131	730.07	363.75	50.	11.	.001	191.56	.566s
BE-7	960.45	479.17	50.	15.	.002	176.10	1.004s
LA-140	976.00	486.96	16.	0.	.000	900.00	.000s
RU-103	993.85	495.90	37.	7.	.001	309.19	.467s
BA-140	1078.19	538.15	26.	14.	.002	140.55	.740s
CS-134	1211.03	604.70	31.	0.	.000	.00	1.845
RU-103	1222.27	610.33	30.	0.	.000	.00	1.822D
RU-106	1244.09	621.26	35.	12.	.001	189.05	.646s
I-131	1272.00	635.25	32.	8.	.001	269.32	.000s
CS-137	1332.05	665.33	32.	23.	.003	121.01	.423s
ZR-95	1449.33	724.09	7.	1.	.000	565.69	.751s
ZR-95	1515.48	757.23	8.	9.	.001	111.11	.594s
NB-95	1536.71	767.86	23.	35.	.004	69.12	.972s
CS-134	1593.00	796.06	6.	0.	.000	489.90	.000s
CO-58	1621.33	810.26	8.	1.	.000	600.00	.501s
MN-54	1661.35	830.30	30.	28.	.003	103.02	1.046s
FE-59	2197.60	1090.96	7.	5.	.001	184.75	1.002s
ZN-65	2230.00	1115.19	3.	0.	.000	346.41	.000s
CO-60	2341.00	1170.81	11.	8.	.001	173.81	.501s
FE-59	2577.99	1289.54	12.	8.	.001	187.08	1.517s
CO-60	2662.05	1331.66	8.	9.	.001	159.73	.766s
K-40	2920.35	1461.06	6.	81.	.010	26.71	1.549s
LA-140	3190.00	1596.17	1.	0.	.000	200.00	.000s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
BE-7	2.8662E+01	3.4808E+01	
K-40	7.7037E+01	7.7037E+01	
MN-54	3.5681E+00	3.6884E+00	
FE-59	4.5080E+00	5.6884E+00	
CO-58	1.7648E+00	2.0426E+00	
CO-60	2.7175E+00	2.7322E+00	
ZN-65	2.6019E+00	2.7148E+00	
ZR-95	4.0178E+00	4.7230E+00	
NB-95	3.2121E+00	4.3154E+00	
RU-103	3.0927E+00	4.0257E+00	
RU-106	3.0885E+01	3.1766E+01	
I-131	3.3945E+00	1.2339E+01	
CS-134	2.8180E+00	2.8570E+00	
CS-137	3.4949E+00	3.4982E+00	
BA-140	9.6193E+00	2.1651E+01	
LA-140	1.8563E+00	4.1781E+00	
CE-141	8.8819E+00	1.2214E+01	
CE-144	1.9567E+01	2.0291E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	284.30 % I-131	304.84 & BA-140
328.76 % LA-140	364.48 % I-131	477.61 & BE-7	487.02 % LA-140
497.08 & RU-103	537.32 % BA-140	610.33 & RU-103	621.84 % RU-106
636.97 & I-131	661.66 & CS-137	724.18 % ZR-95	756.72 % ZR-95
765.79 & NB-95	795.84 % CS-134	810.77 % CO-58	834.84 & MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 & CO-60	1291.60 & FE-59
1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TXW-3915 3.5 LITER
13-JUN-2007 12:00 AMS

Spectrum Filename: C:\User\17413.An1

Fac
7-10-07

Acquisition information
Start time 02-Jul-2007 11:56:58
Live time 9541
Real time 9546
Dead time .06%
Detector/Geometry IDs 1 & 0

Detector system
MCB 1 Input 1

Calibration
Filename: dig1.Clb
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RIS~~0~~ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	13-Jun-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc
		17-Apr-2007 16:01:50
Absorption (Internal)	NO	
Geometry correction	NO	
Random summing	NO	

Energy calibration normalized difference: .0913

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1140.54	569.39	84.	100.	1.106E+04	40.58	2.027	PA-234

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	272.00	134.28	140.	0.	.000	2366.43	.000s
CE-141	294.41	145.50	229.	12.	.001	335.39	.842s
I-131	571.00	284.07	58.	0.	.000	1523.15	.000s
BA-140	607.00	302.10	192.	16.	.002	304.14	.000s
LA-140	662.48	329.89	116.	7.	.001	441.70	.615s
I-131	731.56	364.50	94.	12.	.001	235.70	.609s
BE-7	955.79	476.83	169.	57.	.006	98.58	.609s
LA-140	975.72	486.82	66.	6.	.001	391.58	.744s
RU-103	995.61	496.78	106.	35.	.004	118.87	1.468
BA-140	1079.00	538.56	40.	3.	.000	607.36	.000s
CS-134	1211.03	604.70	88.	594.	.062	9.35	1.845D
RU-103	1222.27	610.33	90.	14.	.001	204.78	1.848D
RU-106	1241.67	620.05	52.	28.	.003	99.97	.723s
I-131	1272.21	635.35	42.	7.	.001	292.77	.490s
CS-137	1324.43	661.51	61.	597.	.063	9.82	1.975
ZR-95	1450.00	724.42	10.	0.	.000	632.46	.000s
ZR-95	1513.94	756.46	37.	16.	.002	150.36	.456s
NB-95	1535.75	767.38	63.	28.	.003	134.10	.865s
CS-134	1592.26	795.69	53.	454.	.048	11.80	1.927
CO-58	1624.93	812.06	20.	14.	.001	117.22	.734s
MN-54	1668.71	833.99	27.	7.	.001	241.55	1.920
FE-59	2200.53	1100.43	10.	20.	.002	83.67	1.113s
ZN-65	2226.16	1113.27	18.	6.	.001	258.20	.716s
CO-60	2347.79	1174.21	10.	12.	.001	112.22	2.122
FE-59	2580.65	1290.87	4.	5.	.001	158.32	.406s
CO-60	2666.41	1333.84	1.	3.	.000	166.38	.474s
K-40	2920.30	1461.04	11.	266.	.028	13.87	2.339
LA-140	3199.60	1600.98	3.	15.	.002	73.68	.577s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA

NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

```

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
BE-7      <      4.6663E+01      5.9746E+01
K-40      <      3.0185E+02      3.0185E+02      6.067E+01
MN-54     <      3.0036E+00      3.1330E+00
FE-59     <      4.5569E+00      6.1257E+00
CO-58     <      2.4285E+00      2.9248E+00
CO-60     <      1.3740E+00      1.3834E+00
ZN-65     <      5.6158E+00      5.9273E+00
ZR-95     <      4.1041E+00      5.0414E+00
NB-95     <      4.3139E+00      6.2805E+00
RU-103    <      4.4291E+00      6.1942E+00
RU-106    <      3.2945E+01      3.4145E+01
I-131     <      3.9516E+00      2.0406E+01
CS-134    <      5.8056E+01      5.9079E+01      4.488E+00
CS-137    <      6.9929E+01      7.0013E+01      6.875E+00
BA-140    <      1.0558E+01      2.9634E+01
LA-140    <      2.1114E+00      5.9261E+00
CE-141    <      6.5223E+00      9.7807E+00
CE-144    <      2.2952E+01      2.4037E+01
    
```

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 4.2983080E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 4.3093740E+02 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

```

133.54 % CE-144      145.44 % CE-141      284.30 % I-131      304.84 & BA-140
328.76 & LA-140     364.48 % I-131      477.61 % BE-7      487.02 % LA-140
497.08 % RU-103     537.32 & BA-140     610.33 % RU-103    621.84 & RU-106
636.97 & I-131      724.18 % ZR-95      756.72 % ZR-95     765.79 & NB-95
810.77 & CO-58      834.84 % MN-54      1099.25 & FE-59    1115.55 & ZN-65
1173.24 % CO-60     1291.60 % FE-59     1332.50 & CO-60    1596.18 & LA-140
    
```

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

rec'd 6/22

Sample description
TXW-3914 3.5 LITER
13-JUN-2007 12:00 AMS

Spectrum Filename: C:\User\37425.An1

Acquisition information

Start time 02-Jul-2007 09:16:44
Live time 9501
Real time 9512
Dead time .12%
Detector/Geometry IDs 3 & 0

*Spec
7-10-07*

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:
RIS method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	13-Jun-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc
		18-Apr-2007 14:24:45
Absorption (Internal)	NO	
Geometry correction	NO	
Random summing	NO	

Energy calibration normalized difference: .1484

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
476.28	238.07	180.	171.	1.001E+04	51.93	1.579	PB-212 s
1137.72	568.85	67.	105.	1.175E+04	34.36	.990	PA-234
1218.80	609.39	61.	47.	5.559E+03	54.88	1.363	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	267.00	133.42	116.	8.	.001	501.73	.500s
CE-141	291.59	145.71	385.	71.	.007	176.39	.781s
I-131	571.44	285.66	153.	43.	.005	175.27	.720s
BA-140	610.00	304.95	53.	11.	.001	246.89	.500s
LA-140	655.40	327.65	93.	30.	.003	161.66	1.017
I-131	727.84	363.87	88.	15.	.002	345.38	.637s
BE-7	956.15	478.05	53.	28.	.003	144.54	.611s
LA-140	973.50	486.72	18.	0.	.000	848.53	.583s
RU-103	991.80	495.88	43.	9.	.001	236.99	1.333
BA-140	1073.39	536.67	79.	18.	.002	192.97	.526s
CS-134	1209.42	604.70	98.	659.	.069	8.87	1.3600
RU-103	1220.68	610.33	51.	0.	.000	.00	.0000
RU-106	1246.07	623.03	23.	19.	.002	92.40	1.018
I-131	1271.98	635.99	30.	24.	.003	88.98	.576s
CS-137	1322.69	661.35	65.	541.	.057	10.76	1.446
ZR-95	1447.00	723.51	9.	0.	.000	600.00	.167s
ZR-95	1513.23	756.63	26.	16.	.002	123.76	.915s
NB-95	1529.71	764.87	13.	5.	.000	222.23	.642s
CS-134	1591.30	795.67	48.	440.	.046	11.26	1.599
CO-58	1621.16	810.60	9.	7.	.001	160.00	.535s
MN-54	1670.00	835.02	9.	1.	.000	724.19	.000s
FE-59	2199.89	1099.99	5.	3.	.000	240.37	1.105s
ZN-65	2227.55	1113.82	15.	12.	.001	148.84	.458s
CO-60	2347.25	1173.68	16.	8.	.001	177.95	.438s
FE-59	2583.00	1291.56	5.	1.	.000	447.21	.000s
CO-60	2562.18	1331.15	13.	9.	.001	198.26	.801s
K-40	2921.72	1460.93	11.	214.	.022	15.60	1.688
LA-140	3188.87	1594.51	1.	3.	.000	187.08	.453s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	< 2.7357E+01	3.4976E+01	
K-40	2.9998E+02	2.9998E+02	5.714E+01
MN-54	< 1.9468E+00	2.0302E+00	
FE-59	< 3.0231E+00	4.0569E+00	
CO-58	< 1.9070E+00	2.2942E+00	
CO-60	< 3.4768E+00	3.5005E+00	
ZN-65	< 5.3479E+00	5.6428E+00	
ZR-95	< 3.4661E+00	4.2525E+00	
NB-95	< 2.0160E+00	2.9286E+00	
RU-103	< 2.9948E+00	4.1800E+00	
RU-106	< 2.3800E+01	2.4661E+01	
I-131	< 3.9173E+00	2.0036E+01	
CS-134	6.1795E+01	6.2677E+01	4.539E+00
CS-137	6.4169E+01	6.4246E+01	6.946E+00
BA-140	< 1.5411E+01	4.2994E+01	
LA-140	< 1.2800E+00	3.5708E+00	
CE-141	< 7.6704E+00	1.1475E+01	
CE-144	< 1.9388E+01	2.0299E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 4.2594740E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 4.2710610E+02 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 % CE-141	284.30 & I-131	304.04 % BA-140
328.76 & LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 & RU-103	537.32 % BA-140	610.33 ? RU-103	621.84 & RU-106
636.97 & I-131	724.18 % ZR-95	756.72 % ZR-95	765.79 & NB-95
810.77 % CO-58	834.84 % MN-54	1099.25 % FE-59	1115.55 & ZN-65
1173.24 % CO-60	1291.60 % FE-59	1332.50 & CO-60	1596.18 & LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TXW-3913 3.5 LITER
13-JUN-2007 13:13 AMS

JWC
7-10-07

Spectrum Filename: C:\User\37416.Ani

Acquisition information

Start time 28-Jun-2007 13:17:24
Live time 8251
Real time 8262
Dead time .13%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic -.125E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	13-Jun-2007 13:13:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

18-Apr-2007 14:24:45

Energy calibration normalized difference: .0523

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
185.23	92.52	196.	145.	9.531E+03	57.09	1.398	PB-214 s
371.29	185.57	136.	119.	6.045E+03	58.39	1.853	U-235 sM
703.96	351.93	99.	76.	5.921E+03	55.14	1.057	PB-214
1218.45	609.22	33.	76.	8.935E+03	31.31	1.362	BI-214 D
2240.05	1120.08	15.	31.	5.705E+03	50.26	1.650	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.
 M Peak is close to a library peak.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	268.66	134.25	154.	47.	.006	142.73 1.459s
CE-141	290.64	145.24	204.	111.	.013	87.72 1.579s
I-131	567.07	283.48	116.	37.	.004	117.52 .977
BA-140	609.39	304.64	56.	31.	.004	132.69 .942s
LA-140	657.03	328.46	53.	25.	.003	161.62 .684s
I-131	730.75	365.33	74.	11.	.001	289.50 .860
BE-7	955.00	477.47	15.	1.	.000	774.60 .000s
LA-140	975.17	487.56	32.	5.	.001	392.52 .436s
RU-103	992.05	496.00	36.	17.	.002	131.53 1.746s
BA-140	1076.39	538.18	26.	21.	.003	100.73 1.289s
CS-134	1209.42	604.70	21.	5.	.001	269.08 1.360D
RU-103	1220.68	610.33	51.	0.	.000	.00 .294D
RU-106	1243.16	621.57	23.	16.	.002	123.40 1.347
I-131	1274.26	637.13	16.	5.	.001	280.31 .641s
CS-137	1320.78	660.39	19.	6.	.001	236.55 .696s
ZR-95	1447.20	723.61	9.	0.	.000	.00 .421s
ZR-95	1513.11	756.57	10.	6.	.001	169.97 .872s
NB-95	1530.97	765.50	20.	12.	.001	147.82 .473s
CS-134	1589.21	794.62	8.	30.	.004	52.49 2.059s
CO-58	1622.00	811.02	15.	2.	.000	565.69 .545s
MN-54	1668.21	834.13	22.	14.	.002	139.00 .754s
FE-59	2200.21	1100.15	11.	9.	.001	163.43 .542s
ZN-65	2230.99	1115.55	10.	1.	.000	790.48 1.648D
CO-60	2347.87	1173.99	7.	5.	.001	180.28 .844s
FE-59	2582.53	1291.33	11.	14.	.002	110.36 1.799
CO-60	2663.47	1331.80	2.	8.	.001	94.50 .725s
K-40	2921.67	1460.91	11.	183.	.022	16.91 2.057
LA-140	3192.82	1596.49	1.	3.	.000	187.08 .678s

s Peak fails shape tests.
 D Peak area deconvoluted.

 ***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	1.8210E+01	2.2134E+01	
K-40	2.9557E+02	2.9557E+02	6.117E+01
MN-54	3.1890E+00	3.2970E+00	
FE-59	4.8372E+00	6.1103E+00	
CO-58	2.6415E+00	3.0593E+00	
CO-60	2.5234E+00	2.5371E+00	
ZN-65	4.9611E+00	5.1772E+00	
ZR-95	4.0276E+00	4.7380E+00	
NB-95	2.7900E+00	3.7534E+00	
RU-103	3.1591E+00	4.1171E+00	
RU-106	2.7467E+01	2.8254E+01	
I-131	4.1454E+00	1.5158E+01	
CS-134	2.5938E+00	2.6298E+00	
CS-137	2.9287E+00	2.9315E+00	
BA-140	1.0849E+01	2.4509E+01	
LA-140	1.4481E+00	3.2715E+00	
CE-141	6.4444E+00	8.8746E+00	
CE-144	2.5432E+01	2.6378E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

----- S U M M A R Y -----
 TOTAL ACTIVITY (59.9 to 2024.1 keV) 2.9556950E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 2.9556950E+02 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 & CE-144	145.44 % CE-141	284.30 & I-131	304.84 % BA-140
328.76 % LA-140	364.48 & I-131	477.61 % BE-7	487.02 % LA-140
497.08 & RU-103	537.32 & BA-140	604.70 % CS-134	610.33 & RU-103
621.84 % RU-106	636.97 % I-131	661.66 & CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 & CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1596.18 % LA-140	

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

Sample description
TXW-3912 3.5 LITER
13-JUN-2007 10:57 AMS

Spectrum Filename: C:\User\47317.Ani

Smc
7-10-07

Acquisition information

Start time 28-Jun-2007 11:28:20
Live time 10431
Real time 10444
Dead time .13%
Detector/Geometry IDs 4 & 4

Detector system
MCB 1 Input 4

Calibration

Filename: D4g1.C1b
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB
Zero offset -.130 keV; Gain .500 keV/channel
Quadratic -.197E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:
RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	13-Jun-2007 10:57:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.pbc
		20-Apr-2007 12:51:49
Absorption (Internal)	NO	

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	ENERGY	COUNTS	BACKGROUND	NET AREA	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1021.44	510.72	80.	139.	2.457E+04	31.77	2.498	TL-208	s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	CHANNEL	PEAK ENERGY	CENTROID	BACKGROUND	NET AREA	INTENSITY	UNCERT	FWHM
		ENERGY	COUNTS	COUNTS	COUNTS	CTS/SEC	2 SIGMA %	keV
CE-144	266.75	133.28	213.	31.	.003	216.79	1.173	
CE-141	292.24	146.03	200.	21.	.002	304.32	.532s	
I-131	567.17	283.53	57.	2.	.000	1060.57	.367s	
BA-140	612.83	306.36	112.	18.	.002	197.72	.689s	
LA-140	659.00	329.46	68.	2.	.000	1289.96	.000s	
I-131	730.00	364.97	35.	0.	.000	.00	.000s	
BE-7	954.00	476.99	17.	0.	.000	824.62	.167s	
LA-140	973.14	486.56	45.	26.	.002	97.60	.713s	
RU-103	992.20	496.10	64.	16.	.002	200.17	.497s	
BA-140	1078.75	539.38	33.	16.	.002	134.05	.611s	
CS-134	1207.46	603.75	24.	14.	.001	126.17	.563s	
RU-103	1220.62	610.33	55.	0.	.000	.00	1.861D	
RU-106	1242.00	621.02	14.	5.	.000	220.69	.204s	
I-131	1273.05	636.55	31.	14.	.001	163.64	.651s	
CS-137	1322.00	661.03	7.	0.	.000	529.15	.333s	
ZR-95	1450.57	725.32	17.	2.	.000	470.34	.525s	
ZR-95	1514.00	757.04	6.	0.	.000	489.90	.000s	
NB-95	1528.54	764.32	22.	11.	.001	161.31	.514s	
CS-134	1588.96	794.53	17.	12.	.001	135.83	1.480	
CO-58	1624.37	812.24	26.	14.	.001	160.78	.892s	
MN-54	1669.24	834.68	17.	15.	.001	129.21	1.293s	
FE-59	2194.44	1097.32	9.	23.	.002	66.88	1.445s	
ZN-65	2227.58	1113.88	9.	6.	.001	191.49	1.147s	
CO-60	2345.00	1172.60	5.	0.	.000	447.21	.167s	
FE-59	2584.00	1292.11	10.	7.	.001	215.71	.780s	
CO-60	2664.60	1332.42	3.	1.	.000	452.16	.700s	
K-40	2920.16	1460.21	14.	49.	.005	54.71	1.867s	
LA-140	3191.00	1595.63	0.	0.	.000	.00	.000s	

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	< 2.7630E+01	3.3593E+01	
K-40	< 1.0076E+02	1.0076E+02	
MN-54	< 3.9634E+00	4.0979E+00	
FE-59	< 7.1148E+00	8.9099E+00	
CO-58	< 4.9184E+00	5.6973E+00	
CO-60	< 3.1199E+00	3.1368E+00	
ZN-65	< 7.1670E+00	7.4796E+00	
ZR-95	< 9.3722E+00	1.1028E+01	
NB-95	< 4.3607E+00	5.8687E+00	
RU-103	< 5.4728E+00	7.1349E+00	
RU-106	< 2.7908E+01	2.8709E+01	
I-131	< 3.4378E+00	1.2591E+01	
CS-134	< 3.5576E+00	3.6071E+00	
CS-137	< 2.9210E+00	2.9237E+00	
BA-140	< 1.5885E+01	3.5922E+01	
LA-140	< 2.3600E+00	5.3388E+00	
CE-141	< 7.3087E+00	1.0069E+01	
CE-144	< 3.3493E+01	3.4740E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 & I-131	304.84 & BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 & RU-103	537.32 & BA-140	604.70 & CS-134	610.33 ! RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.19 & ZR-95
756.72 % ZR-95	765.79 & NB-95	795.84 & CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 & FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TXW-3911 3.5 LITER
12-JUN-2007 13:09 AMS

Jan
7-10-07

Spectrum Filename: C:\User\87392.An1

Acquisition information

Start time 28-Jun-2007 13:35:36
Live time 10001
Real time 10015
Dead time .14%
Detector/Geometry IDs 8 & 0

Detector system
MCB 5 Input 4

Calibration

Filename: D8g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RIS^o method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	12-Jun-2007 13:09:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkgSw. pbc
Absorption (Internal)	NO	16-Apr-2007 14:29:22

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
185.32	92.76	304.	126.	9.517E+03	56.08	1.324	TH-234
703.44	351.80	133.	136.	1.168E+04	43.94	1.510	PB-214 s
1021.30	510.73	79.	222.	2.531E+04	24.25	3.248	TL-208 s
1217.72	608.94	38.	81.	1.061E+04	30.86	1.793	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	265.98	133.08	161.	16.	.002	229.81	.663s
CE-141	293.08	146.63	183.	7.	.001	609.89	.480s
I-131	569.99	285.08	130.	17.	.002	264.10	1.001s
BA-140	610.00	305.08	27.	0.	.000	1039.23	.000s
LA-140	657.36	328.76	30.	0.	.000	.00	.0000D
I-131	727.49	363.83	68.	15.	.001	186.83	.566s
BE-7	951.43	475.79	53.	13.	.001	217.90	.713s
LA-140	971.82	485.99	53.	17.	.002	159.89	.683s
RU-103	994.09	497.12	28.	8.	.001	194.75	.711s
BA-140	1073.00	536.58	45.	0.	.000	.00	.000s
CS-134	1209.24	604.70	45.	12.	.001	170.49	1.790D
RU-103	1220.50	610.33	104.	8.	.001	388.44	1.794D
RU-106	1241.98	621.07	37.	16.	.002	175.92	.456s
I-131	1272.67	636.41	37.	14.	.001	163.06	.667s
CS-137	1323.76	661.96	27.	19.	.002	107.62	.988s
ZR-95	1449.55	724.86	22.	15.	.002	122.05	.839s
ZR-95	1517.36	758.77	19.	20.	.002	101.96	.421s
NB-95	1531.70	765.94	14.	4.	.000	273.33	1.044s
CS-134	1592.83	796.50	28.	12.	.001	184.33	.657s
CO-58	1619.85	810.02	15.	3.	.000	390.90	.376s
MN-54	1672.92	838.56	27.	17.	.002	145.75	.417s
FE-59	2195.89	1098.07	10.	3.	.000	319.72	.480s
ZN-65	2233.00	1116.63	15.	15.	.001	126.49	.450s
CO-60	2346.00	1173.14	3.	0.	.000	346.41	.000s
FE-59	2584.92	1292.62	7.	4.	.000	217.03	1.575s
CO-60	2664.00	1332.16	3.	2.	.000	296.65	.000s
K-40	2920.84	1460.61	10.	189.	.019	17.76	2.523s
LA-140	3194.66	1597.56	3.	15.	.002	73.68	1.075s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
BE-7	< 2.7705E+01	3.4124E+01	
K-40	# 2.4204E+02	2.4204E+02	6.196E+01
MN-54	< 3.1437E+00	3.2575E+00	
FE-59	< 4.8075E+00	6.1695E+00	
CO-58	< 2.3375E+00	2.7343E+00	
CO-60	< 2.2586E+00	2.2717E+00	
ZN-65	< 5.6792E+00	5.9437E+00	
ZR-95	< 5.6932E+00	6.7714E+00	
NB-95	< 2.4877E+00	3.4146E+00	
RU-103	< 2.3799E+00	3.1577E+00	
RU-106	< 2.9673E+01	3.0581E+01	
I-131	< 3.5223E+00	1.4060E+01	
CS-134	< 3.2073E+00	3.2549E+00	
CS-137	< 3.2613E+00	3.2646E+00	
BA-140	< 1.1798E+01	2.8165E+01	
LA-140	< 1.8879E+00	4.5069E+00	
CE-141	< 5.7065E+00	8.0304E+00	
CE-144	< 2.4034E+01	2.4989E+01	

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

S U M M A R Y

 TOTAL ACTIVITY (60.1 to 2024.4 keV) 2.4204020E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 2.4204020E+02 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 & CE-141	284.30 % I-131	304.84 % BA-140
328.76 ? LA-140	364.48 % I-131	477.61 & BE-7	487.02 & LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 & ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 & MN-54	1099.25 & FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1596.18 & LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.

Sample description
TXW-3910 3.5 LITER
12-JUN-2007 10:49 AMS

Inc
7-10-07

Spectrum Filename: C:\User\37415.Ani

Acquisition information

Start time 28-Jun-2007 10:49:42
Live time 8601
Real time 8612
Dead time .14%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.Clb
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files.

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.500E+00)$
= 2.8571E+05

Detection limit method:
RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status	Comments
Decay correct to date	YES 12-Jun-2007 10:49:00
Decay during acquisition	YES
Decay during collection	NO
Peaked background correction	YES bkg3w.pbc

Absorption (Internal) NO

18-Apr-2007 14:24:45

Energy calibration normalized difference: .0005

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
370.66	105.25	230.	125.	6.346E+03	51.72	1.265	U-235 s
589.57	294.73	132.	84.	5.730E+03	58.90	1.341	PB-214 sM
703.67	351.79	74.	88.	6.815E+03	36.79	.947	PB-214
1218.58	609.28	38.	106.	1.249E+04	25.34	1.362	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.
 M Peak is close to a library peak.

***** I D E N T I F I E D P E A K S U M M A R Y *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	265.79	132.81	137.	54.	.006	118.75	.600s
CE-141	290.00	144.92	65.	0.	.000	1612.45	.083s
I-131	570.88	285.38	60.	32.	.004	134.39	.869
BA-140	611.00	305.45	26.	0.	.000	1019.80	.000s
LA-140	657.04	328.47	59.	45.	.005	107.40	1.879s
I-131	728.81	364.36	45.	14.	.002	145.69	.643s
BE-7	955.83	477.89	33.	13.	.001	159.12	1.836s
LA-140	975.11	487.53	19.	3.	.000	416.28	.363s
RU-103	994.17	497.06	19.	4.	.000	312.08	.261s
BA-140	1072.73	536.35	22.	5.	.001	280.00	.706s
CS-134	1209.42	604.70	24.	14.	.002	111.26	1.360D
RU-103	1220.68	610.33	140.	5.	.001	678.54	1.363D
RU-106	1243.82	621.91	13.	4.	.000	281.88	.432s
I-131	1272.05	636.02	22.	12.	.001	149.11	.493s
CS-137	1323.43	661.71	9.	2.	.000	319.44	.469s
ZR-95	1447.00	723.51	10.	1.	.000	663.32	.167s
ZR-95	1513.00	756.51	3.	0.	.000	346.41	.000s
NB-95	1531.67	765.85	9.	0.	.000	689.61	.394s
CS-134	1593.00	796.52	3.	0.	.000	346.41	.000s
CQ-58	1619.38	809.70	17.	5.	.001	292.62	.500s
MN-54	1668.00	834.02	8.	0.	.000	653.20	.000s
FE-59	2195.82	1097.96	13.	12.	.001	126.50	1.963
ZN-65	2231.88	1115.99	4.	3.	.000	220.73	1.389
CO-60	2349.28	1174.69	8.	10.	.001	126.60	.709s
FE-59	2580.02	1290.07	4.	3.	.000	261.28	.568s
CO-60	2667.75	1333.94	7.	3.	.000	275.68	.599s
K-40	2921.18	1460.66	13.	51.	.006	43.56	1.123s
LA-140	3191.00	1595.58	2.	0.	.000	282.84	.083s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	ACTIVITY	ACTIVITY	UNCERTAINTY	COUNTING
		pCi/LITER	pCi/LITER		2 SIGMA
BE-7	<	2.4577E+01	3.0264E+01		
K-40	<	6.1189E+01	6.1189E+01		
MN-54	<	2.0035E+00	2.0760E+00		
FE-59	<	5.0262E+00	6.4484E+00		
CO-58	<	2.6605E+00	3.1115E+00		
CO-60	<	3.1260E+00	3.1441E+00		
ZN-65	<	3.0964E+00	3.2405E+00		
ZR-95	<	4.0359E+00	4.7993E+00		
NB-95	<	1.8261E+00	2.5056E+00		
RU-103	<	2.3752E+00	3.1505E+00		
RU-106	<	2.0464E+01	2.1089E+01		
I-131	<	3.3316E+00	1.3279E+01		
CS-134	<	2.6357E+00	2.6747E+00		
CS-137	<	2.0441E+00	2.0461E+00		
BA-140	<	9.8484E+00	2.3488E+01		
LA-140	<	1.6390E+00	3.9090E+00		
CE-141	<	3.5668E+00	5.0174E+00		
CE-144	<	2.3074E+01	2.3990E+01		

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 % CE-141	284.30 & I-131	304.84 & BA-140
328.76 % LA-140	384.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 & I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 & CO-58
834.84 & MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 & CO-60
1291.60 & FE-59	1332.50 & CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

6/20/07

Tony:

Enclosed in two coolers are the first 3 well samples. They are all from outside the Protected Area of Davis-Besse.

MW-1S
MW-1D

MW-26S
MW-26D
MS01-MW-26D (for both tritium and gamma matrix spike)
MSD01-MW-26D (for both tritium and gamma matrix spike)

MW-7S

Please analyze to our normal REMP LLD of 330 pCi/liter. If you have any questions, we can discuss at REMP/RETS Conference. I will bring a copy of our sampling plan.

Thanks.



Al Percival
Davis-Besse

JUN 22 2007



SAMPLE ANALYSIS REQUEST / CHAIN OF CUSTODY
 FORM X-2189 (REV. 05-07)

CHAIN OF CUSTODY REQUIRED?

YES NO

PAGE 1 OF 1

COMPANY NAME FENOC			TURN AROUND TIME (Surcharges May Apply)		ANALYSIS REQUESTED										SAMPLE MATRIX			
ADDRESS / LOCATION DAVIS BEBE GROUNDWATER			<input type="checkbox"/> SAME DAY		TRIUMPH GAMMA PRESERVATIVE										A = ASBESTOS AS = FILTER-ARSENIC F = FUEL OIL & COAL M = METAL O = OIL P = LEAD IN PAINT W = WATER OT = OTHER			
BILLING ADDRESS DB			<input type="checkbox"/> 24 HOURS															
CITY OAK HARBOR			<input type="checkbox"/> 48 HOURS															
STATE OHIO			<input checked="" type="checkbox"/> STANDARD															
ZIP CODE 43449			RESULTS															
TELEPHONE NO. 419-321-7883			<input checked="" type="checkbox"/> MAIL															
FAX NO.			<input type="checkbox"/> FAX												SAMPLE REMARKS: (Conditions, Bottle Type, Etc.)		LAB I.D.	
REPORT ATTENTION Al Percival			<input checked="" type="checkbox"/> E-MAIL															
PURCHASE ORDER NO.																		
SAMPLE IDENTIFICATION		MATRIX	COLLECTION DATE	COLLECTION TIME														
MW-26S		WATER	6/13/07	0957-1017	X													
MW-26D		"	"	1154-1313	X													
MS01-MW-26D		"	"	1154-1313	X													
MS001-MW-26D		"	"	1154-1313	X													
MW-7S		"	"	1435-1453	X													
RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)		DATE	TIME	ADDITIONAL COMMENTS: Analyze to normal REAMP LLD for H-3 (330 pCi/L)										
RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)		DATE	TIME											
RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)		DATE	TIME											



700 Landwehr Road • Northbrook, IL 60062-2310
ph. (847) 584-0700 • fax (847) 584-4517

Mr. Al Percival
FirstEnergy Corporation
Mail Stop 1041
5501 North State Route 2
Oak Harbor, Ohio 43449

LABORATORY REPORT NO.: 8003-100-363
DATE: 07-12-07
SAMPLES RECEIVED: 07-03-07
PURCHASE ORDER NO.: _____

Dear Mr. Percival

Enclosed are results of the analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Should you have any questions or other concerns, please do not hesitate to call.

Sincerely,

S.A. Coorlim,
Quality Assurance

Bronia Grob, M. S.
Laboratory Manager

SAMPLES RETAINED THIRTY DAYS AFTER ANALYSIS

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MW-12S	MW-18S	MW-18D	DBD-01	MW-20S
Date Collected	06-14-07	06-14-07	06-14-07	06-14-07	6/25/2007
Time Collected	10:07	12:30	14:27	14:27	10:16
Lab Code	TXW-4117	TXW-4118	TXW-4119	TXW-4120	TXW-4121
Isotope	Concentration (pCi/L)				
H-3 ^a	657 ± 118	277 ± 106	204 ± 103	764 ± 121	255 ± 104
Mn-54	< 2.3	< 1.8	< 1.7	< 3.6	< 3.0
Fe-59	< 7.7	< 4.7	< 7.9	< 6.8	< 10.2
Co-58	< 2.7	< 3.1	< 2.1	< 2.2	< 6.4
Co-60	< 3.0	< 2.6	< 2.4	< 2.5	< 3.6
Zn-65	< 5.0	< 3.9	< 5.2	< 3.0	< 5.5
Zr-Nb-95	< 6.2	< 3.2	< 4.2	< 5.0	< 6.9
Cs-134	< 3.1	< 3.5	< 3.2	< 3.3	< 4.3
Cs-137	< 3.4	< 1.8	< 3.6	< 2.3	< 7.1
Ba-La-140	< 8.9	< 5.1	< 6.9	< 7.8	< 6.2

Sample Location	MW-20D	MW-32S	DBD-02	MW-32D	MW-15S
Date Collected	6/25/2007	6/25/2007	6/25/2007	6/26/2007	6/26/2007
Time Collected	12:50	12:00	14:58	9:50	12:00
Lab Code	TXW-4122	TXW-4123	TXW-4124	TXW-4125	TXW-4126
Isotope	Concentration (pCi/L)				
H-3	328 ± 107	5838 ± 237	279 ± 105	466 ± 112	375 ± 95
Mn-54	< 3.2	< 2.8	< 3.3	< 2.4	< 2.7
Fe-59	< 9.5	< 11.0	< 11.3	< 4.2	< 5.5
Co-58	< 3.2	< 3.9	< 2.6	< 1.7	< 3.5
Co-60	< 3.3	< 2.8	< 4.1	< 2.4	< 2.8
Zn-65	< 6.2	< 4.0	< 8.5	< 5.7	< 3.8
Zr-Nb-95	< 6.2	< 4.9	< 3.1	< 2.7	< 4.4
Cs-134	< 5.2	< 4.7	< 3.9	< 2.6	< 3.7
Cs-137	< 6.1	< 3.3	< 5.4	< 3.4	< 3.8
Ba-La-140	< 7.8	< 11.2	< 14.2	< 3.3	< 5.2

The error given is the probable counting error at the 95% confidence level.
Less than (<), value is based on a 4.66 sigma counting error for the background sample.

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MW-15D	MW-30S	MW-33S	MW-33D
Date Collected	06-26-07	06-27-07	06-27-07	06-27-07
Time Collected	14:45	10:00	11:55	13:44
Lab Code	TXW-4127	TXW-4128	TXW-4129	TXW-4130
Isotope	Concentration (pCi/L)			
H-3	704 ± 108	1307 ± 128	2287 ± 154	2975 ± 171
Mn-54	< 3.6	< 3.0	< 3.0	< 2.7
Fe-59	< 9.5	< 7.9	< 14.7	< 5.6
Co-58	< 3.6	< 3.8	< 5.1	< 2.8
Co-60	< 3.8	< 2.7	< 4.1	< 2.8
Zn-65	< 5.1	< 1.6	< 4.3	< 4.7
Zr-Nb-95	< 4.7	< 2.8	< 2.8	< 2.8
Cs-134	< 5.6	< 2.7	< 2.0	< 2.7
Cs-137	< 3.6	< 1.7	< 3.0	< 3.9
Ba-La-140	< 11.4	< 5.0	< 10.6	< 7.3

The error given is the probable counting error at the 95% confidence level.
Less than (<), value is based on a 4.66 sigma counting error for the background sample.

TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: JAC
 Date approved: 7-12-07

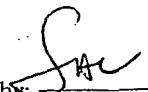
Sample Count Time (min.):	100	Standard Count Time (min.):	200	Date Counted:	7/11/2007
Background Count Time (min.):	200	Standard Counts:	61688	Calculated by:	Rick
Background Counts:	978	Counter Efficiency:	0.196	Date Calculated:	7/12/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	Sigma	
					Activity	Error		3.00	4.66
TXW-4117	6/14/2007	13.0	859	0.996	657.061	± 117.983	148.004	117.809	182.997
TXW-4118	6/14/2007	13.0	645	0.996	277.031	± 105.927	112.428	117.809	182.997
TXW-4119	6/14/2007	13.0	604	0.996	204.222	± 103.457	107.120	117.809	182.997
TXW-4120	6/14/2007	13.0	919	0.996	763.611	± 121.148	159.568	117.809	182.997

☞ =Best probable result.

TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: 
 Date approved: 7-12-07

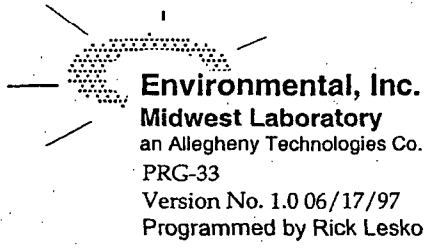
Sample Count Time (min.): 100
 Background Count Time (min.): 200
 Background Counts: 552

Standard Count Time (min.): 200
 Standard Counts: 56219
 Counter Efficiency: 0.180

Date Counted: 7/11/2007
 Calculated by: Rick
 Date Calculated: 7/12/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00 Sigma	4.66 Sigma
					Activity	± Error			
TXW-4126	6/26/2007	13.0	470	0.998	375.031	± 95.334	108.120	96.348	149.660
TXW-4127	6/26/2007	13.0	640	0.998	703.666	± 107.841	144.180	96.348	149.660
TXW-4128	6/27/2007	13.0	952	0.998	1306.608	± 127.627	218.782	96.333	149.637
TXW-4129	6/27/2007	13.0	1459	0.998	2286.564	± 154.483	347.231	96.333	149.637
TXW-4130	6/27/2007	13.0	1815	0.998	2974.659	± 170.836	439.145	96.333	149.637

☞ = Best probable result.



TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: Jac
 Date approved: 7-12-07

Sample Count Time (min.):	100	Standard Count Time (min.):	200	Date Counted:	7/11/2007
Background Count Time (min.):	200	Standard Counts:	53734	Calculated by:	Rick
Background Counts:	707	Counter Efficiency:	0.171	Date Calculated:	7/12/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00 Sigma	4.66 Sigma
					Activity	± Error			
TXW-4122	6/25/2007	13.0	515	0.998	327.797	± 106.767	115.701	114.485	177.833
TXW-4123	6/25/2007	13.0	3230	0.998	5838.446	± 236.937	828.626	114.485	177.833
TXW-4124	6/25/2007	13.0	491	0.998	279.084	± 104.899	111.554	114.485	177.833
TXW-4125	6/26/2007	13.0	583	0.998	465.746	± 111.875	128.562	114.467	177.806
TXW-4121	6/25/2007	13.0	479	0.998	254.728	± 103.952	109.572	114.485	177.833

☞ =Best probable result.

Sample description

TXW-4117 3.5 LITER
14-JUN-2007 09:33 AMS

Spectrum Filename: C:\User\17430.Ani

Acquisition information

Start time 11-Jul-2007 09:48:27
Live time 9001
Real time 9011
Dead time .11%
Detector/Geometry IDs 1 & 0

Detector system

MCB 1 Input 1

Calibration

Filename: dig1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05
Detection limit method:
RIS~~o~~ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	14-Jun-2007 09:33:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc
		17-Apr-2007 18:01:50
Absorption (Internal)	NO	

Energy calibration normalized difference: .0378

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
705.66	351.52	100.	98.	7.057E+03	50.21	1.483	PB-214 s
1023.68	510.85	152.	180.	1.854E+04	37.56	1.732	TL-200 s
1219.29	608.84	63.	62.	7.148E+03	44.63	1.847	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	271.52	134.04	363.	32.	.004	230.74	1.789
CE-141	295.50	146.05	245.	14.	.002	378.20	1.065s
I-131	571.00	284.07	39.	0.	.000	1249.00	.000s
BA-140	611.30	304.25	105.	9.	.001	392.68	.435s
LA-140	656.00	327.05	138.	35.	.004	130.45	.876s
I-131	733.70	365.57	74.	22.	.002	144.71	.968s
BE-7	957.00	477.44	16.	0.	.000	800.00	.000s
LA-140	976.33	487.12	48.	17.	.002	159.93	.421s
RU-103	994.73	496.34	59.	17.	.002	167.96	.912s
BA-140	1076.67	537.39	25.	14.	.001	124.54	.758s
CS-134	1211.03	604.70	41.	5.	.001	402.25	1.845D
RU-103	1222.27	610.33	100.	10.	.001	277.19	1.848D
RU-106	1244.64	621.54	16.	4.	.000	265.33	.929s
I-131	1273.47	635.98	48.	35.	.004	100.73	4.150s
CS-137	1320.08	659.33	35.	25.	.003	109.79	.676s
ZR-95	1446.06	722.45	16.	7.	.001	201.36	1.495
ZR-95	1512.78	755.87	12.	3.	.000	346.41	.923s
NB-95	1533.18	766.09	37.	34.	.004	90.64	.692s
CS-134	1591.07	795.09	26.	1.	.000	1754.99	.366s
CO-58	1622.51	810.84	13.	14.	.002	111.56	.625s
MN-54	1668.52	833.90	10.	3.	.000	269.43	.707s
FE-59	2197.13	1098.73	12.	8.	.001	164.92	.964s
ZN-65	2227.78	1114.08	11.	13.	.001	112.35	.504s
CO-60	2348.12	1174.37	18.	6.	.001	301.32	.584s
FE-59	2584.56	1292.83	5.	4.	.000	230.70	.789s
CO-60	2659.22	1330.23	11.	11.	.001	162.26	.928s
K-40	2920.01	1460.90	17.	86.	.010	35.86	1.925
LA-140	3190.39	1596.36	2.	8.	.001	105.96	.455s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	1.5219E+01	2.1626E+01	
K-40	7.9133E+01	7.9133E+01	
MN-54	2.1203E+00	2.2514E+00	
FE-59	5.0496E+00	7.6901E+00	
CO-58	2.1108E+00	2.7496E+00	
CO-60	2.9516E+00	2.9805E+00	
ZN-65	4.6532E+00	5.0245E+00	
ZR-95	5.2207E+00	6.9942E+00	
NB-95	3.6473E+00	6.2214E+00	
RU-103	3.5460E+00	5.7127E+00	
RU-106	1.9808E+01	2.0841E+01	
I-131	3.7480E+00	3.8683E+01	
CS-134	3.0397E+00	3.1161E+00	
CS-137	3.4136E+00	3.4194E+00	
BA-140	8.8256E+00	3.8280E+01	
LA-140	2.0613E+00	8.9408E+00	
CE-141	7.1463E+00	1.2714E+01	
CE-144	3.9173E+01	4.1833E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- ‡ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description

TXW-4110 3.5 LITER
14-JUN-2007 09:33 AMS

Swc
7-12-07

Spectrum Filename: C:\User\37440.An1

Acquisition information

Start time 11-Jul-2007 11:41:49
Live time 7721
Real time 7730
Dead time .12%
Detector/Geometry IDs 3 & 0

Detector system

MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	14-Jun-2007 09:33:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

18-Apr-2007 14:24:45

Observation (Internal)

NO

Energy calibration normalized difference: .0113

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
590.31	295.10	73.	53.	3.596E+03	59.83	1.439	PB-214 s
704.23	352.07	76.	83.	6.469E+03	47.40	.959	PB-214 s
1021.42	510.69	75.	139.	1.431E+04	32.62	2.285	TL-208 s
1218.01	608.99	33.	51.	6.030E+03	42.05	1.362	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** I D E N T I F I E D P E A K S U M M A R Y *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.56	133.20	116.	46.	.006	128.45	1.402s
CE-141	292.72	146.28	149.	60.	.008	125.59	.745s
I-131	568.00	283.94	50.	0.	.000	1825.74	.000s
BA-140	609.43	304.66	32.	37.	.005	92.53	1.049s
LA-140	656.51	328.20	50.	25.	.003	176.98	.625s
I-131	730.00	364.96	22.	3.	.000	379.08	.000s
BE-7	954.59	477.27	40.	10.	.001	259.70	.619s
LA-140	975.53	487.74	23.	3.	.000	566.79	.321s
RU-103	996.20	498.08	26.	5.	.001	301.99	.879
BA-140	1074.01	536.99	22.	18.	.002	103.81	1.455s
CS-134	1209.42	604.70	33.	6.	.001	304.72	1.3600
RU-103	1220.68	610.33	35.	0.	.000	.00	.2740
RU-106	1242.00	620.99	11.	3.	.000	251.40	.158s
I-131	1274.00	637.00	4.	0.	.000	400.00	.000s
CS-137	1323.00	661.50	5.	0.	.000	447.21	.000s
ZR-95	1446.22	723.12	12.	6.	.001	182.57	.971
ZR-95	1513.91	756.97	12.	9.	.001	149.07	.937s
NB-95	1530.00	765.01	7.	4.	.000	200.00	.000s
CS-134	1592.47	796.25	9.	3.	.000	300.40	.523s
CO-58	1623.13	811.58	10.	5.	.001	200.00	.831s
MN-54	1669.67	834.85	4.	8.	.001	100.00	.896s
FE-59	2196.00	1098.05	3.	2.	.000	296.65	.158s
ZN-65	2232.23	1116.16	5.	7.	.001	137.60	1.429
CO-60	2345.67	1172.89	3.	0.	.000	.00	.352s
FE-59	2582.67	1291.40	2.	1.	.000	382.97	.362s
CO-60	2665.75	1332.94	2.	3.	.000	178.89	1.910
K-40	2921.43	1460.79	7.	53.	.007	34.93	2.035
LA-140	3188.50	1594.33	0.	9.	.001	66.67	.750s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED ACTIVITY	UNCERTAINTY	2 SIGMA COUNTING
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	2.9590E+01	4.2091E+01	
K-40	<	6.0769E+01	6.0769E+01	
MN-54	<	1.7185E+00	1.0250E+00	
FE-59	<	3.0972E+00	4.7227E+00	
CO-58	<	2.3646E+00	3.0826E+00	
CO-60	<	2.5997E+00	2.6252E+00	
ZN-65	<	3.5847E+00	3.8715E+00	
ZR-95	<	4.9250E+00	6.6036E+00	
NB-95	<	1.8779E+00	3.2083E+00	
RU-103	<	2.9364E+00	4.7373E+00	
RU-106	<	2.1183E+01	2.2292E+01	
I-131	<	2.9092E+00	3.0230E+01	
CS-134	<	3.3842E+00	3.4695E+00	
CS-137	<	1.8328E+00	1.0360E+00	
BA-140	<	1.0771E+01	4.6919E+01	
LA-140	<	1.1713E+00	5.1020E+00	
CE-141	<	5.8988E+00	1.0512E+01	
CE-144	<	2.3687E+01	2.5300E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 & CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 & LA-140
497.08 & RU-103	537.32 % BA-140	604.70 % CS-134	610.33 & RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.18 & ZR-95
756.72 % ZR-95	765.79 & NB-95	795.84 % CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 & LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TXW-4119 3.5 LITER
14-JUN-2007 14:27 AMS

Sw
7-12-07

Spectrum Filename: C:\User\87417.Ani

Acquisition information

Start time 11-Jul-2007 11:41:39
Live time 8101
Real time 8103
Dead time .03%
Detector/Geometry IDs B & 0

Detector system
MCB 5 Input 4

Calibration

Filename: D0g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	14-Jun-2007 14:27:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkgbw.pbc

16-Apr-2007 14:29:22

Absorption (Internal) NO
NO

Energy calibration normalized difference: .3462

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
703.59	351.88	78.	83.	7.111E+03	44.86	1.676	PB-214
1021.67	510.91	79.	173.	1.973E+04	30.05	2.319	TL-208 s
1218.53	609.34	36.	70.	1.022E+04	31.26	1.793	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** I D E N T I F I E D P E A K S U M M A R Y *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.90	133.54	168.	0.	.000	.00	1.525
CE-141	292.11	146.15	118.	9.	.001	347.83	.633s
I-131	569.80	284.98	57.	5.	.001	436.35	.913s
BA-140	608.87	304.52	25.	3.	.000	415.69	1.000s
LA-140	657.94	329.05	86.	37.	.005	105.51	.579s
I-131	725.04	362.60	66.	33.	.004	100.50	.941s
BE-7	954.36	477.26	30.	11.	.001	182.73	.578s
LA-140	972.46	486.31	27.	7.	.001	233.12	.468s
RU-103	1000.64	500.40	39.	29.	.004	97.04	.542s
BA-140	1074.00	537.08	20.	1.	.000	1171.89	.000s
CS-134	1209.24	604.70	29.	10.	.001	158.33	1.790D
RU-103	1220.50	610.33	35.	0.	.000	.00	1.483D
RU-106	1246.53	623.35	41.	29.	.004	118.03	.863s
I-131	1273.27	636.72	14.	3.	.000	371.18	.597s
CS-137	1327.18	663.67	22.	12.	.002	149.11	.595s
ZR-95	1446.92	723.54	22.	15.	.002	135.32	.552s
ZR-95	1512.91	756.54	12.	4.	.000	264.58	.927s
NB-95	1530.50	765.34	8.	1.	.000	763.03	.900s
CS-134	1592.00	796.09	7.	0.	.000	.00	.000s
CO-58	1620.00	810.09	4.	0.	.000	400.00	.208s
MN-54	1669.10	834.64	4.	7.	.001	110.66	.630s
FE-59	2200.24	1100.24	8.	16.	.002	93.94	.499s
ZN-65	2232.50	1116.38	7.	4.	.000	212.13	.690s
CO-60	2345.95	1173.11	5.	10.	.001	100.96	2.705s
FE-59	2583.33	1291.82	1.	0.	.000	221.11	.394s
CO-60	2664.50	1332.46	2.	1.	.000	447.21	.673s
K-40	2922.88	1461.63	15.	62.	.008	41.82	1.740
LA-140	3194.21	1597.33	1.	7.	.001	90.47	1.210s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

NUCLIDE	TIME OF COUNT	ACTIVITY	TIME CORRECTED	ACTIVITY	UNCERTAINTY	2 SIGMA
		pCi/LITER		pCi/LITER	COUNTING	
BE-7	<	2.5714E+01		3.6480E+01		
K-40	<	8.3000E+01		8.3000E+01		
MN-54	<	1.6359E+00		1.7365E+00		
FE-59	<	5.1936E+00		7.8941E+00		
CO-58	<	1.6187E+00		2.1059E+00		
CO-60	<	2.3502E+00		2.3731E+00		
ZN-65	<	4.7897E+00		5.1700E+00		
ZR-95	<	7.0025E+00		9.4756E+00		
NB-95	<	2.4789E+00		4.2180E+00		
RU-103	<	3.4571E+00		5.5573E+00		
RU-106	<	3.8467E+01		4.0465E+01		
I-131	<	4.2246E+00		4.3131E+01		
CS-134	<	3.1524E+00		3.2313E+00		
CS-137	<	3.6285E+00		3.6347E+00		
BA-140	<	9.7030E+00		4.1800E+01		
LA-140	<	1.6098E+00		6.9349E+00		
CE-141	<	5.6719E+00		1.0063E+01		
CE-144	<	3.0212E+01		3.2253E+01		

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

145.44 % CE-141	284.30 % I-131	304.84 % BA-140	328.76 % LA-140
364.48 % I-131	477.61 % BE-7	487.02 % LA-140	497.08 % RU-103
537.32 % BA-140	604.70 % CS-134	610.33 % RU-103	621.04 % RU-106
636.97 % I-131	661.66 % CS-137	724.18 % ZR-95	756.72 % ZR-95
765.79 % NB-95	795.84 % CS-134	810.77 % CO-58	834.84 % MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description

TXW-4120 3.5 LITER
14-JUN-2007 12:00 AMS

Spectrum Filename: C:\User\17431.An1

Sm
7-12-07

Acquisition information

Start time 11-Jul-2007 12:23:10
Live time 0500
Real time 0511
Dead time .13%
Detector/Geometry IDs 1 & 0

Detector system

MCB 1 Input 1

Calibration

Filename: dig1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.900 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+05 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	14-Jun-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

Absorption (Internal) NO 17-Apr-2007 10:01:50

Energy calibration normalized difference: .2708

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1023.55	510.78	108.	203. 2.091E+04	28.74	2.312	TL-208 s
1219.70	609.04	52.	90. 1.046E+04	39.46	1.806	BI-214 s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	271.19	133.87	326.	59.	.007	120.78 1.932
CE-141	293.00	144.00	85.	0.	.000	1843.91 .146s
I-131	572.99	285.06	91.	9.	.001	330.61 .961s
BA-140	612.36	304.78	63.	7.	.001	323.69 .508s
LA-140	656.79	327.04	88.	15.	.002	210.68 .562s
I-131	727.31	362.37	77.	9.	.001	362.99 .600s
BE-7	958.41	478.15	64.	24.	.003	139.44 .584s
LA-140	975.00	486.46	15.	0.	.000	774.60 .167s
RU-103	993.78	495.86	20.	3.	.000	401.85 .313s
BA-140	1078.72	538.42	27.	6.	.001	258.20 .520s
CS-134	1211.03	604.70	42.	0.	.000	.00 1.845
RU-103	1222.27	610.33	45.	0.	.000	.00 1.787D
RU-106	1241.48	619.96	39.	20.	.002	137.48 1.244s
I-131	1274.33	636.41	6.	1.	.000	489.90 .501s
CS-137	1324.94	661.77	14.	6.	.001	194.37 .685s
ZR-95	1451.00	724.92	8.	0.	.000	565.69 .000s
ZR-95	1513.00	755.98	3.	0.	.000	346.41 .000s
NB-95	1533.25	766.13	19.	4.	.000	324.04 1.090s
CS-134	1589.84	794.48	18.	9.	.001	165.27 .490s
CO-58	1620.67	809.92	7.	3.	.000	264.58 .403s
MN-54	1663.78	831.52	28.	27.	.003	96.65 1.015s
FE-59	2199.08	1099.70	7.	5.	.001	174.36 .562s
ZN-65	2230.56	1115.47	4.	1.	.000	400.00 .638s
CO-60	2346.00	1173.31	3.	0.	.000	346.41 .000s
FE-59	2582.00	1291.55	1.	0.	.000	200.00 .000s
CO-60	2665.73	1333.50	7.	3.	.000	275.68 .450s
K-40	2921.06	1461.42	19.	67.	.000	40.86 1.957
LA-140	3189.71	1596.02	1.	1.	.000	274.05 .460s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED	UNCERTAINTY	2 SIGMA
	ACTIVITY	ACTIVITY	COUNTING	
	pCi/LITER	pCi/LITER	pCi/LITER	
BE-7	(3.2230E+01	4.5802E+01		
K-40	(8.2614E+01	8.2614E+01		
MN-54	(3.3952E+00	3.6051E+00		
FE-59	(4.4676E+00	6.8045E+00		
CO-58	(1.6748E+00	2.1817E+00		
CO-60	(2.5014E+00	2.5258E+00		
ZN-65	(2.7793E+00	3.0011E+00		
ZR-95	(4.1766E+00	5.5957E+00		
NB-95	(2.9452E+00	5.0243E+00		
RU-103	(2.3552E+00	3.7947E+00		
RU-106	(3.2195E+01	3.3875E+01		
I-131	(4.0215E+00	4.1525E+01		
CS-134	(3.2524E+00	3.3341E+00		
CS-137	(2.2861E+00	2.2900E+00		
BA-140	(9.7801E+00	4.2433E+01		
LA-140	(1.7944E+00	7.7855E+00		
CE-141	(4.5075E+00	8.0200E+00		
CE-144	(3.9329E+01	4.2000E+01		

(MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.75 & LA-140	364.48 & I-131	477.61 % BE-7	487.02 % LA-140
497.08 & RU-103	537.32 & BA-140	610.33 & RU-103	621.84 & RU-106
636.97 % I-131	661.66 % CS-137	724.18 % ZR-95	756.72 % ZR-95
765.79 % NB-95	795.84 & CS-134	810.77 % CO-58	834.84 & MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TXW-4121 3.5 LITER
25-JUN-2007 10:16 AMS

Sum
7-12-07

Spectrum Filename: C:\User\47341.An1

Acquisition information
Start time 11-Jul-2007 10:00:40
Live time 8621
Real time 8630
Dead time .11%
Detector/Geometry IDs 4 & 4

Detector system
MCB 1 Input 4

Calibration
Filename: D4g1.C1b
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB

Zero offset -.130 keV; Gain .500 keV/channel
Quadratic -.197E-07 keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	25-Jun-2007 10:16:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.pbc
Absorption (Internal)	NO	20-Apr-2007 12:51:49

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1217.68	608.86	42.	41.	8.399E+03	55.25	1.668	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	269.47	134.64	390.	58.	.007	216.94	2.265s
CE-141	290.07	144.95	216.	55.	.006	133.66	1.107
I-131	569.00	284.45	34.	0.	.000	1166.19	.000s
BA-140	615.00	307.45	111.	15.	.002	248.73	.000s
LA-140	659.02	329.47	60.	20.	.002	214.16	.840s
I-131	728.00	363.97	64.	10.	.001	268.82	.151s
BE-7	951.51	475.75	42.	22.	.003	125.31	.736s
LA-140	973.57	486.78	48.	20.	.002	145.60	1.580s
RU-103	991.57	495.78	54.	17.	.002	179.58	.555s
BA-140	1076.17	538.09	12.	2.	.000	424.26	.844s
CS-134	1209.36	604.70	23.	5.	.001	310.86	1.665D
RU-103	1220.62	610.33	61.	9.	.001	244.24	1.669D
RU-106	1238.30	619.17	21.	6.	.001	276.89	.430s
I-131	1273.94	636.99	13.	11.	.001	114.84	1.039s
CS-137	1324.85	662.45	39.	20.	.002	137.48	1.167s
ZR-95	1448.00	724.04	7.	0.	.000	529.15	.000s
ZR-95	1513.00	756.54	6.	1.	.000	600.00	.000s
NB-95	1531.75	765.92	20.	8.	.001	195.79	1.309
CS-134	1590.08	795.09	8.	7.	.001	134.12	.813s
CO-58	1613.49	806.90	22.	8.	.001	244.95	.435s
MN-54	1670.83	835.47	6.	4.	.000	200.00	.492s
FE-59	2195.44	1097.82	8.	5.	.001	238.94	.521s
ZN-65	2230.46	1115.33	3.	10.	.001	94.31	.621s
CO-60	2346.00	1173.10	2.	0.	.000	282.84	.000s
FE-59	2583.75	1291.99	3.	13.	.002	82.11	1.918
CO-60	2665.00	1332.62	3.	0.	.000	346.41	.000s
K-40	2920.65	1460.45	3.	34.	.004	42.42	1.273s
LA-140	3192.67	1596.47	0.	10.	.001	63.25	1.250s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	CORRECTED ACTIVITY	UNCERTAINTY	2 SIGMA COUNTING
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	4.6761E+01	5.7573E+01	
K-40	<	9.8628E+01	9.8628E+01	
MN-54	<	2.8597E+00	2.9631E+00	
FE-59	<	7.9672E+00	1.0220E+01	
CO-58	<	5.4689E+00	6.3953E+00	
CO-60	<	3.5342E+00	3.5546E+00	
ZN-65	<	5.2775E+00	5.5220E+00	
ZR-95	<	8.3877E+00	9.9731E+00	
NB-95	<	5.0355E+00	6.9077E+00	
RU-103	<	6.0700E+00	8.0498E+00	
RU-106	<	4.1113E+01	4.2370E+01	
I-131	<	5.4917E+00	2.1867E+01	
CS-134	<	4.2493E+00	4.3123E+00	
CS-137	<	7.0650E+00	7.0721E+00	
BA-140	<	1.2348E+01	2.9432E+01	
LA-140	<	2.5968E+00	6.1895E+00	
CE-141	<	9.1153E+00	1.2820E+01	
CE-144	<	5.3614E+01	5.5740E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 % CE-141	284.30 % I-131	304.84 & BA-140
328.76 % LA-140	364.48 % I-131	477.61 & BE-7	487.02 % LA-140
497.08 & RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TXW-4122 3.5 LITER
25-JUN-2007 12:50 AMS

Spectrum Filename: C:\User\47342.Ani

Sum
7-12-07

Acquisition information

Start time 11-Jul-2007 12:26:39
Live time 7921
Real time 7931
Dead time .13%
Detector/Geometry IDs 4 & 4

Detector system
MCB 1 Input 4

Calibration

Filename: D4g1.Clb
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB
Zero offset -.130 keV; Gain .500 keV/channel
Quadratic -.197E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RIS~~g~~ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	25-Jun-2007 12:50:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.pbc
Absorption (Internal)	NO	20-Apr-2007 12:51:49

Energy calibration normalized difference: .2435
 No unknown peaks passed sensitivity test.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA	FWHM keV
CE-144	269.48	134.65	207.	67.	.000	116.95	.637s
CE-141	288.92	144.37	327.	25.	.003	263.53	.545s
I-131	569.64	284.77	63.	28.	.004	143.92	1.080
BA-140	611.53	305.72	64.	34.	.004	137.45	.672s
LA-140	659.92	329.92	95.	33.	.004	119.70	1.010
I-131	729.00	364.47	16.	0.	.000	000.00	.000s
BE-7	958.65	479.31	41.	6.	.001	379.95	.593s
LA-140	977.10	488.54	41.	16.	.002	151.03	.710s
RU-103	994.00	496.99	10.	0.	.000	632.46	.000s
BA-140	1071.67	535.84	27.	12.	.002	160.73	.667s
CS-134	1208.93	604.48	28.	10.	.001	211.11	1.109s
RU-103	1220.62	610.33	9.	0.	.000	.00	.0000
RU-106	1241.25	620.64	39.	7.	.001	373.90	.492s
I-131	1271.06	635.95	12.	4.	.001	300.00	.486s
CS-137	1327.15	663.60	24.	10.	.002	121.32	.675s
ZR-95	1447.31	723.69	10.	14.	.002	132.48	.572s
ZR-95	1513.09	756.59	15.	8.	.001	165.31	.471s
NB-95	1530.44	765.27	13.	3.	.000	359.01	.701s
CS-134	1595.62	797.86	23.	17.	.002	134.46	.931s
CO-58	1622.00	811.05	3.	2.	.000	296.65	.650s
MN-54	1656.64	833.38	6.	7.	.001	127.21	.468s
FE-59	2190.66	1095.42	5.	18.	.002	72.86	.724s
ZN-65	2231.30	1115.75	4.	4.	.000	195.18	.724s
CO-60	2344.89	1172.55	4.	1.	.000	503.32	.469s
FE-59	2584.00	1292.11	5.	5.	.001	186.19	.000s
CO-60	2665.13	1332.68	2.	12.	.002	74.54	.572s
K-40	2922.52	1461.39	6.	35.	.004	46.49	1.157s
LA-140	3191.67	1595.97	1.	0.	.000	221.11	.394s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	ACTIVITY	ACTIVITY	ACTIVITY
	pCi/LITER	pCi/LITER	pCi/LITER

BE-7	<	5.0265E+01	5.1083E+01
K-40	<	1.0778E+02	1.0778E+02
MN-54	<	3.0650E+00	3.1757E+00
FE-59	<	7.3677E+00	9.4501E+00
CO-58	<	2.7485E+00	3.2140E+00

CO-60	<	3.3146E+00	3.3338E+00
ZN-65	<	5.8856E+00	6.1591E+00
ZR-95	<	1.2216E+01	1.4524E+01
NB-95	<	4.5225E+00	6.2032E+00
RU-103	<	3.2842E+00	4.3549E+00
RU-106	<	6.0586E+01	6.2437E+01
I-131	<	3.1673E+00	1.2606E+01
CS-134	<	5.0903E+00	5.1656E+00
CS-137	<	6.1139E+00	6.1201E+00
BA-140	<	1.8849E+01	4.4912E+01
LA-140	<	3.2803E+00	7.8163E+00
CE-141	<	1.2071E+01	1.6974E+01
CE-144	<	4.3076E+01	4.4784E+01

< MDA value printed.

A Activity printed; but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 & CE-144	145.44 & CE-141	284.30 % I-131	304.84 & BA-140
328.76 & LA-140	364.48 % I-131	477.61 & BE-7	487.02 & LA-140
497.08 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 ? RU-103
621.84 & RU-106	636.97 & I-131	661.66 & CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 & CS-134	810.77 % CO-58
834.84 & MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.

& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction

Sample description
TXW-4123 3.5 LITER
25-JUN-2007 14:40 AMS

Save
7-12-07

Spectrum Filename: C:\User\57278.An1

Acquisition information

Start time 11-Jul-2007 10:00:46
Live time 8821
Real time 8822
Dead time .01%
Detector/Geometry IDs 5 & 0

Detector system
MCB 5 Input 1

Calibration

Filename: D5g1.C1b
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB
Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4048 for an energy of 2031.42keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06 / (1.0000E+00 * 3.5000E+00)
= 2.8571E+05

Detection limit method:
RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Decay correct to date	YES	25-Jun-2007 14:40:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc

Absorption (Internal) NO

20-Apr-2007 12:56:58

Energy calibration normalized difference: 1.0000
 No unknown peaks passed sensitivity test.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	258.81	134.35	95.	53.	.006	119.51	.663s
CE-141	279.89	144.75	52.	5.	.001	344.87	1.181
I-131	563.00	284.60	37.	2.	.000	1207.31	.000s
BA-140	603.05	304.41	37.	14.	.002	155.72	.819s
LA-140	654.47	329.85	36.	6.	.001	325.66	.697s
I-131	725.00	364.76	10.	1.	.000	663.32	.000s
BE-7	952.25	477.39	10.	3.	.000	295.65	.429s
LA-140	971.72	487.05	26.	13.	.002	155.48	.958s
RU-103	992.15	497.18	29.	9.	.001	248.78	.551s
BA-140	1081.10	541.33	25.	25.	.003	97.98	.524s
CS-134	1208.66	604.70	19.	5.	.001	287.07	1.791D
RU-103	1219.99	610.33	17.	9.	.001	153.51	1.796D
RU-106	1241.13	620.84	11.	4.	.000	302.37	1.060s
I-131	1274.47	637.42	7.	6.	.001	155.06	.647s
CS-137	1321.67	660.89	3.	1.	.000	452.16	.746s
ZR-95	1444.69	722.12	8.	8.	.001	155.31	.464s
ZR-95	1514.00	756.63	0.	1.	.000	200.00	.498s
NB-95	1534.67	766.93	7.	7.	.001	148.27	.836s
CS-134	1595.00	797.00	4.	14.	.002	83.36	1.108s
CO-58	1623.00	810.96	4.	0.	.000	.00	.000s
MN-54	1670.67	834.73	3.	2.	.000	296.65	.401s
FE-59	2201.33	1099.97	3.	1.	.000	452.16	1.503s
ZN-65	2231.50	1115.08	1.	1.	.000	312.69	.835s
CO-60	2346.00	1172.46	1.	1.	.000	200.00	.281s
FE-59	2577.50	1288.64	0.	17.	.002	48.51	.582s
CO-60	2665.14	1332.67	0.	13.	.001	55.47	.586s
K-40	2913.33	1457.54	0.	14.	.002	53.45	.755s
LA-140	3190.75	1597.39	0.	9.	.001	66.67	1.009s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	ACTIVITY	ACTIVITY	ACTIVITY
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	< 3.0882E+01	3.7932E+01	
K-40	< 2.7179E+01	2.7179E+01	
MN-54	< 2.7452E+00	2.8432E+00	
FE-59	< 8.6001E+00	1.1000E+01	
CO-58	< 3.3067E+00	3.8600E+00	

CO-60	<	2.7927E+00	2.8087E+00
ZN-65	<	3.8679E+00	4.0456E+00
ZR-95	<	7.7734E+00	9.2242E+00
NB-95	<	3.5679E+00	4.8767E+00
RU-103	<	5.1276E+00	6.7781E+00
RU-106	<	3.7383E+01	3.8512E+01
I-131	<	2.5729E+00	1.0084E+01
CS-134	<	4.5857E+00	4.6528E+00
CS-137	<	3.2533E+00	3.2566E+00
BA-140	<	1.9397E+01	4.5776E+01
LA-140	<	4.7613E+00	1.1236E+01
CE-141	<	5.5263E+00	7.7418E+00
CE-144	<	3.3316E+01	3.4621E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 & CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 & LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 % RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.18 & ZR-95
756.72 % ZR-95	765.79 & NB-95	795.84 & CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 & FE-59	1332.50 % CO-60	1460.81 & K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction

Sample description
TXW-4124 3.5 LITER
25-JUN-2007 12:00 AMS

Sw
7-12-07

Spectrum Filename: C:\User\57279.An1

Acquisition information

Start time 11-Jul-2007 14:58:58
Live time 10259
Real time 10262
Dead time .03%
Detector/Geometry IDs 5 & 0

Detector system
MCB 5 Input 1

Calibration:

Filename: D5g1.C1b
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB

Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files:

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4040 for an energy of 2031.42keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RIS method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	25-Jun-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc
Absorption (Internal)	NO	20-Apr-2007 12:56:58

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1019.67	510.63	40.	121. 2.584E+04	30.22	2.736	TL-208 s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	259.43	134.66	80.	37.	.004	147.14 1.051s
CE-141	280.70	145.15	76.	7.	.001	322.51 .679s
I-131	561.00	283.61	19.	0.	.000	871.78 .165s
BA-140	600.59	303.19	77.	12.	.001	285.94 .797s
LA-140	649.00	327.14	57.	15.	.001	181.84 1.514
I-131	723.92	364.23	16.	1.	.000	945.16 1.040s
BE-7	951.65	477.09	17.	25.	.002	71.00 2.411s
LA-140	972.00	487.18	6.	1.	.000	529.15 .000s
RU-103	991.96	497.08	29.	0.	.000	.00 1.709
BA-140	1073.00	537.31	9.	1.	.000	724.19 .000s
CS-134	1208.66	604.70	18.	8.	.001	171.60 1.791D
RU-103	1219.99	610.33	23.	11.	.001	132.16 1.796D
RU-106	1241.50	621.02	8.	2.	.000	473.29 .442s
I-131	1274.00	637.18	3.	0.	.000	346.41 .000s
CS-137	1319.32	659.72	20.	17.	.002	127.25 .580s
ZR-95	1445.94	722.74	5.	9.	.001	112.58 .637s
ZR-95	1513.18	756.23	6.	11.	.001	97.91 1.200s
NB-95	1531.42	765.31	3.	1.	.000	331.66 .420s
CS-134	1593.75	796.38	5.	1.	.000	412.31 .748s
CO-58	1625.00	811.99	1.	6.	.001	100.29 1.633
MN-54	1673.05	835.92	7.	8.	.001	132.66 1.375s
FE-59	2192.60	1095.59	6.	7.	.001	159.08 .400s
ZN-65	2224.81	1111.72	8.	1.	.000	1148.91 1.722
CO-60	2349.00	1173.97	1.	0.	.000	200.00 .000s
FE-59	2582.00	1290.90	0.	0.	.000	.00 .000s
CO-60	2663.62	1331.91	3.	15.	.001	82.82 .697s
K-40	2919.32	1460.55	4.	16.	.002	74.92 1.175s
LA-140	3184.28	1594.13	4.	15.	.001	84.75 .481s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
BE-7	< 3.2477E+01	4.0056E+01	
K-40	< 4.3664E+01	4.3664E+01	
MN-54	< 3.1817E+00	3.2977E+00	
FE-59	< 8.8045E+00	1.1318E+01	
CO-58	< 2.1852E+00	2.5588E+00	
CO-60	< 4.0337E+00	4.0571E+00	
ZN-65	< 8.1456E+00	8.5275E+00	
ZR-95	< 5.1768E+00	6.1642E+00	
NB-95	< 2.2784E+00	3.1339E+00	
RU-103	< 4.3946E+00	5.8419E+00	
RU-106	< 2.9726E+01	3.0642E+01	
I-131	< 2.7857E+00	1.1222E+01	
CS-134	< 3.8305E+00	3.8877E+00	
CS-137	< 5.3484E+00	5.3538E+00	
BA-140	< 1.0996E+01	2.6401E+01	
LA-140	< 5.9217E+00	1.4218E+01	
CE-141	< 5.7344E+00	8.0880E+00	
CE-144	< 2.7596E+01	2.8700E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 % CE-141	284.30 % I-131	304.84 & BA-140
328.76 & LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
537.32 % BA-140	604.70 % CS-134	610.33 % RU-103	621.84 % RU-106
636.97 % I-131	661.66 & CS-137	724.18 & ZR-95	756.72 % ZR-95
765.79 % NB-95	795.84 % CS-134	810.77 & CO-58	834.84 & MN-54
1099.25 & FE-59	1115.55 & ZN-65	1173.24 % CO-60	1291.60 ? FE-59
1332.50 % CO-60	1460.81 % K-40	1596.18 & LA-140	

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

Sample description
TXW-4125 3.5 LITER
26-JUN-2007 09:50 AMS

*See
7-12-07*

Spectrum Filename: C:\User\37441.An1

Acquisition information

Start time 11-Jul-2007 13:53:26
Live time 7241
Real time 7250
Dead time .13%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB
Zero offset -.110 keV; Gain .500 keV/channel
Quadratic -.125E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RIS~~o~~ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	26-Jun-2007 09:50:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Absorption (Internal) NO
18-Apr-2007 14:24:45

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
703.37	351.64	99.	95.	7.397E+03	45.05	1.145	PB-214 s
1218.10	609.04	21.	126.	1.485E+04	20.53	1.362	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.00	132.92	70.	0.	.000	1673.32	.167s
CE-141	290.30	145.07	76.	23.	.003	157.24	.695
I-131	569.00	284.44	24.	0.	.000	979.80	.000s
BA-140	606.88	303.39	93.	15.	.002	246.13	.533s
LA-140	657.00	328.45	22.	0.	.000	938.08	.000s
I-131	729.00	364.46	36.	0.	.000	1547.76	.891
BE-7	955.10	477.52	39.	13.	.002	175.41	.629s
LA-140	973.50	486.72	10.	0.	.000	632.46	.583s
RU-103	993.00	496.48	8.	0.	.000	565.69	.117s
BA-140	1074.00	536.98	13.	0.	.000	.00	.000s
CS-134	1209.42	604.70	15.	2.	.000	681.51	1.360D
RU-103	1220.68	610.33	45.	0.	.000	.00	.202D
RU-106	1242.88	621.43	25.	4.	.001	460.33	.563s
I-131	1276.00	638.00	7.	1.	.000	479.58	.000s
CS-137	1324.82	662.41	20.	8.	.001	216.64	.513s
ZR-95	1448.00	724.01	5.	0.	.000	447.21	.000s
ZR-95	1514.00	757.01	13.	6.	.001	226.60	.000s
NB-95	1531.00	765.51	8.	2.	.000	498.89	.372s
CS-134	1589.27	794.65	15.	9.	.001	170.69	1.685s
CO-58	1622.00	811.02	2.	0.	.000	282.84	.000s
MN-54	1671.89	835.96	8.	3.	.000	290.59	.385s
FE-59	2199.00	1099.55	3.	0.	.000	.00	.000s
ZN-65	2232.80	1116.45	9.	7.	.001	168.52	.694s
CO-60	2346.89	1173.50	4.	3.	.000	221.11	1.086s
FE-59	2503.00	1291.56	2.	0.	.000	282.84	.000s
CO-60	2663.00	1331.56	0.	9.	.001	66.67	.500s
K-40	2921.10	1460.66	9.	105.	.014	23.26	1.845s
LA-140	3191.00	1595.50	1.	1.	.000	282.84	.167s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	< 3.0978E+01	3.7735E+01	
K-40	# 1.6916E+02	1.6916E+02	5.476E+01
MN-54	< 2.3355E+00	2.4155E+00	
FE-59	< 3.2807E+00	4.1548E+00	
CO-58	< 1.4438E+00	1.6749E+00	
CO-60	< 2.3469E+00	2.3598E+00	
ZN-65	< 5.5047E+00	5.7472E+00	
ZR-95	< 3.3898E+00	3.9949E+00	
NB-95	< 2.0146E+00	2.7191E+00	
RU-103	< 2.0596E+00	2.6921E+00	
RU-106	< 3.2197E+01	3.3130E+01	
I-131	< 3.5600E+00	1.3205E+01	
CS-134	< 2.5644E+00	2.6004E+00	
CS-137	< 3.3804E+00	3.3837E+00	
BA-140	< 9.5230E+00	2.1709E+01	
LA-140	< 1.4576E+00	3.3227E+00	
CE-141	< 4.5438E+00	6.2795E+00	
CE-144	< 1.9997E+01	2.0749E+01	

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

S U M M A R Y

 TOTAL ACTIVITY (59.9 to 2024.1 keV) 1.6916160E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 1.6916160E+02 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 & CE-144	145.44 % CE-141	284.30 % I-131	304.84 & BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 & RU-103
621.84 % RU-106	636.97 & I-131	661.66 & CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 & CS-134	810.77 % CO-58
834.84 & MN-54	1099.25 % FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 & CO-60	1596.18 % LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.

Sample description

TXW-4126 3.5 LITER
26-JUN-2007 12:00 AMS

Spectrum Filename: C:\User\A87418.Ani

*See
7-12-07*

Acquisition information

Start time 11-Jul-2007 13:58:45
Live time 7409
Real time 7411
Dead time .03%
Detector/Geometry IDs 8 & 0

Detector system

MCB 5 Input 4

Calibration

Filename: DBg1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RIS² method
Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	26-Jun-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkgbw.pbc

Absorption (Internal) NO

16-Apr-2007 14:29:22

Energy calibration normalized difference: .1460

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
702.52	351.34	65.	108. 9.279E+03	36.56	1.357	CE-143 s
1021.22	510.69	59.	150. 1.706E+04	27.97	3.122	TL-208 s
1218.02	609.09	29.	101. 1.315E+04	25.04	1.793	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** I D E N T I F I E D P E A K S U M M A R Y *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.39	134.29	155.	17.	.002	239.30 1.027
CE-141	291.75	145.96	102.	30.	.004	162.43 .950s
I-131	563.23	281.70	114.	16.	.002	271.57 1.484
BA-140	610.00	305.00	23.	0.	.000	959.17 .000s
LA-140	657.94	329.05	66.	21.	.003	154.45 1.422
I-131	728.87	364.51	50.	23.	.003	116.24 1.553
BE-7	954.00	477.00	6.	0.	.000	489.90 .000s
LA-140	970.43	485.29	20.	29.	.004	79.01 1.551
RU-103	995.00	497.50	9.	0.	.000	600.00 .000s
BA-140	1077.00	530.50	10.	2.	.000	616.44 .498s
CS-134	1209.24	604.70	32.	7.	.001	260.13 1.7900
RU-103	1220.50	610.33	34.	0.	.000	.00 1.6660
RU-106	1243.00	621.50	5.	0.	.000	447.21 .000s
I-131	1275.07	637.62	14.	6.	.001	207.28 .519s
CS-137	1323.70	661.93	20.	14.	.002	120.31 .732s
ZR-95	1440.92	724.55	11.	7.	.001	189.67 .503s
ZR-95	1513.00	756.59	4.	0.	.000	400.00 .000s
NB-95	1530.60	765.43	15.	3.	.000	390.90 .460s
CS-134	1591.10	795.60	12.	11.	.002	125.06 .804s
CO-58	1619.37	809.70	14.	9.	.001	179.16 .940s
MN-54	1667.62	833.90	10.	9.	.001	144.59 .955s
FE-59	2190.00	1099.12	4.	1.	.000	400.00 .000s
ZN-65	2231.80	1116.03	3.	2.	.000	322.49 .706s
CO-60	2346.73	1173.50	6.	8.	.001	141.42 .688s
FE-59	2502.60	1291.50	3.	0.	.001	94.32 .611s
CO-60	2664.00	1332.20	3.	14.	.002	84.17 .709s
K-40	2921.93	1461.16	4.	51.	.007	35.73 .941s
LA-140	3193.00	1596.73	2.	1.	.000	494.41 .000s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	ACTIVITY	ACTIVITY	UNCERTAINTY	COUNTING
		pCi/LITER	pCi/LITER		2 SIGMA
BE-7	<	1.2917E+01	1.5717E+01		
K-40	<	7.9216E+01	7.9216E+01		
MN-54	<	2.6513E+00	2.7416E+00		
FE-59	<	4.3655E+00	5.5212E+00		
CO-58	<	3.0558E+00	3.5419E+00		
CO-60	<	2.7944E+00	2.8096E+00		
ZN-65	<	3.6139E+00	3.7722E+00		
ZR-95	<	5.3500E+00	6.2990E+00		
NB-95	<	3.2754E+00	4.4133E+00		
RU-103	<	1.9010E+00	2.4810E+00		
RU-106	<	1.4658E+01	1.5081E+01		
I-131	<	4.0569E+00	1.4936E+01		
CS-134	<	3.6734E+00	3.7247E+00		
CS-137	<	3.8094E+00	3.8130E+00		
BA-140	<	1.0066E+01	2.2839E+01		
LA-140	<	2.2935E+00	5.2039E+00		
CE-141	<	7.6449E+00	1.0546E+01		
CE-144	<	3.1694E+01	3.2878E+01		

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 & I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 & LA-140
497.08 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 & RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- # - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Inc
7-12-07

Sample description
TXW-4127 3.5 LITER
26-JUN-2007 14:45 AMS

Spectrum Filename: C:\User\47343.Ani

Acquisition information

Start time 11-Jul-2007 14:41:12
Live time 8061
Real time 8071
Dead time .13%
Detector/Geometry IDs 4 & 4

Detector system
MCB 1 Input 4

Calibration

Filename: D4g1.C1b
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB
Zero offset -.130 keV; Gain .500 keV/channel
Quadratic $-.197E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05
Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	26-Jun-2007 14:45:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.pbc
Absorption (Internal)	NO	20-Apr-2007 12:51:49

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1218.49	609.26	33.	44.	9.221E+03	47.04	1.669	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	268.83	134.32	255.	18.	.002	255.31	.474s
CE-141	290.00	144.91	233.	12.	.001	364.39	.168s
I-131	570.34	285.12	104.	33.	.004	191.07	2.041s
BA-140	607.43	303.67	90.	15.	.002	236.64	.430s
LA-140	654.95	327.43	88.	22.	.003	164.12	.476s
I-131	726.76	363.35	46.	17.	.002	134.25	1.907s
BE-7	957.00	478.49	40.	19.	.002	140.83	1.375s
LA-140	973.00	486.49	9.	0.	.000	600.00	.167s
RU-103	994.00	496.99	10.	0.	.000	632.46	.000s
BA-140	1074.00	537.00	9.	1.	.000	600.00	.000s
CS-134	1209.36	604.70	34.	16.	.002	115.74	1.665D
RU-103	1220.62	610.33	26.	0.	.000	.00	.582D
RU-106	1245.75	622.90	18.	12.	.001	146.25	.543s
I-131	1275.25	637.65	22.	16.	.002	127.48	1.643s
CS-137	1322.18	661.12	7.	4.	.001	181.38	.467s
ZR-95	1448.78	724.43	18.	6.	.001	258.20	.686s
ZR-95	1513.56	756.83	22.	6.	.001	279.89	.936s
NA-95	1530.00	765.05	7.	0.	.000	529.15	.333s
CS-134	1588.74	794.42	21.	7.	.001	239.05	.442s
CO-58	1620.00	810.05	5.	0.	.000	447.21	.167s
MN-54	1669.00	834.56	8.	1.	.000	683.13	.000s
FE-59	2200.57	1100.38	6.	9.	.001	125.98	.518s
ZN-65	2231.67	1115.93	3.	1.	.000	346.41	1.000s
CO-60	2348.95	1174.58	13.	6.	.001	236.61	.631s
FE-59	2579.00	1289.61	6.	4.	.000	234.52	.833s
CO-60	2662.16	1331.20	3.	11.	.001	102.61	.694s
K-40	2921.67	1460.96	3.	44.	.005	35.14	1.766s
LA-140	3193.36	1596.81	4.	8.	.001	112.00	.667s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

BE-7	<	4.8747E+01	5.9240E+01
K-40	<	1.0205E+02	1.0205E+02
MN-54	<	3.5074E+00	3.6261E+00
FE-59	<	7.5137E+00	9.4903E+00
CO-58	<	3.1181E+00	3.6111E+00
CO-60	<	3.8160E+00	3.8366E+00
ZN-65	<	4.8881E+00	5.1009E+00
ZR-95	<	1.2030E+01	1.4151E+01
NB-95	<	3.4794E+00	4.6002E+00
RU-103	<	3.2362E+00	4.2172E+00
RU-106	<	4.1084E+01	4.2260E+01
I-131	<	4.9869E+00	1.8226E+01
CS-134	<	5.4915E+00	5.5677E+00
CS-137	<	3.5714E+00	3.5748E+00
BA-140	<	1.1487E+01	2.5942E+01
LA-140	<	5.0381E+00	1.1370E+01
CE-141	<	1.0089E+01	1.3892E+01
CE-144	<	4.6760E+01	4.8498E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 & CE-144	145.44 % CE-141	284.30 & I-131	304.04 & BA-140
328.76 & LA-140	364.48 & I-131	477.61 & BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 & RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 & CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 & CO-60
1291.60 & FE-59	1332.50 & CO-60	1460.81 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TXW-412B 3.5 LITER
27-JUN-2007 10:00 AMS

Spec
7-12-07

Spectrum Filename: C:\User\17432.Ani

Acquisition information
Start time 11-Jul-2007 14:47:16
Live time 8001
Real time 8011
Dead time .13%
Detector/Geometry IDs 1 & 0

Detector system
MCB 1 Input 1

Calibration
Filename: d1g1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05
Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	27-Jun-2007 10:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc
Absorption (Internal)	NO	17-Apr-2007 10:01:50
Creation correction	NO	

Energy calibration normalized difference: .1044

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1024.79	511.40	96.	157. 1.615E+04	33.84	2.600	RH-106M s
1219.57	608.98	51.	44. 5.090E+03	55.22	1.847	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	268.05	132.30	279.	21.	.003	278.97 .875s
CE-141	292.30	144.45	133.	4.	.000	019.80 .430s
I-131	573.00	285.07	46.	6.	.001	273.52 .000s
BA-140	608.91	303.06	141.	27.	.003	185.87 1.803s
LA-140	662.40	329.85	100.	18.	.002	208.27 .747s
I-131	731.49	364.46	70.	27.	.003	119.52 2.640s
BE-7	958.00	477.94	15.	1.	.000	774.60 .000s
LA-140	978.78	488.35	29.	7.	.001	253.28 .419s
RU-103	995.08	496.51	33.	7.	.001	249.30 .560s
BA-140	1077.00	537.56	8.	0.	.000	565.69 .000s
CS-134	1211.03	604.70	25.	2.	.000	804.17 1.845D
RU-103	1222.27	610.33	83.	7.	.001	374.97 1.840D
RU-106	1248.32	623.38	43.	30.	.004	105.88 .716s
I-131	1275.00	636.75	11.	1.	.000	663.32 .000s
CS-137	1325.00	661.80	7.	0.	.000	607.36 .000s
ZR-95	1447.52	723.18	15.	15.	.002	108.43 .507s
ZR-95	1510.05	754.58	17.	8.	.001	191.83 .696s
NB-95	1531.17	765.08	5.	1.	.000	557.77 .401s
CS-134	1594.00	796.56	11.	0.	.000	853.75 .000s
CO-58	1625.44	812.32	26.	21.	.003	110.11 .551s
MN-54	1668.57	833.92	17.	14.	.002	137.89 1.392
FE-59	2189.51	1094.91	16.	13.	.002	152.56 1.252s
ZN-65	2231.00	1115.70	1.	0.	.000	200.00 .000s
CO-60	2346.00	1173.31	9.	7.	.001	166.60 .564s
FE-59	2581.29	1291.19	5.	5.	.001	186.26 1.503s
CO-60	2668.00	1330.63	7.	2.	.000	428.17 .501s
K-40	2920.31	1461.05	4.	84.	.010	24.19 1.961
LA-140	3189.48	1595.91	2.	4.	.000	164.64 .845s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	1.6299E+01	1.9606E+01	
K-40	7.8235E+01	7.8235E+01	
MN-54	2.9378E+00	3.0319E+00	
FE-59	6.3105E+00	7.8722E+00	
CO-58	3.2898E+00	3.7803E+00	
CO-60	2.6926E+00	2.7064E+00	
ZN-65	1.5784E+00	1.6434E+00	
ZR-95	5.6090E+00	6.5421E+00	
NB-95	2.1213E+00	2.8080E+00	
RU-103	3.0557E+00	3.9263E+00	
RU-106	3.5708E+01	3.6675E+01	
I-131	4.0937E+00	1.3965E+01	
CS-134	2.6501E+00	2.6849E+00	
CS-137	1.6761E+00	1.6776E+00	
BA-140	5.8807E+00	1.2719E+01	
LA-140	2.2947E+00	4.9626E+00	
CE-141	5.9534E+00	8.0591E+00	
CE-144	3.8637E+01	3.9995E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 & CE-141	284.30 % I-131	304.84 & BA-140
328.76 & LA-140	364.48 % I-131	477.61 % BE-7	487.02 & LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 & CO-60	1460.81 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TXW-4129 3.5 LITER
27-JUN-2007 11:55 AMS

Soc
7-12-07

Spectrum Filename: C:\User\57280.An1

Acquisition information

Start time 11-Jul-2007 15:25:57
Live time 8241
Real time 8243
Dead time .03%
Detector/Geometry IDs 5 & 0

Detector system
MCB 5 Input 1

Calibration

Filename: 05g1.C1b
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB
Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4048 for an energy of 2031.42keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	27-Jun-2007 11:55:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc
		20-Apr-2007 12:56:58
Absorption (Internal)	NO	
Geometry correction	NO	

Energy calibration normalized difference: 1.0000
 No unknown peaks passed sensitivity test.

***** I D E N T I F I E D P E A K S U M M A R Y *****
 NUCLIDE PEAK CENTROID BACKGROUND NET AREA INTENSITY UNCERT FWHM
 CHANNEL ENERGY COUNTS COUNTS CTS/SEC 2 SIGMA % keV

NUCLIDE	CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	258.15	134.02	91.	22.	.003	139.16	1.312
CE-141	275.00	142.34	99.	20.	.002	165.60	.196s
I-131	561.50	283.86	11.	0.	.000	663.32	.577s
BA-140	604.84	305.30	23.	8.	.001	178.89	.464s
LA-140	651.85	328.16	23.	8.	.001	178.00	.441s
I-131	724.00	364.27	17.	2.	.000	597.33	.000s
BE-7	951.12	476.83	20.	19.	.002	109.72	1.239
LA-140	971.72	487.04	11.	15.	.002	93.55	.755s
RU-103	991.00	496.61	9.	1.	.000	538.52	.000s
BA-140	1079.62	540.60	21.	26.	.003	94.84	.572s
CS-134	1209.00	604.87	3.	0.	.000	346.41	.000s
RU-103	1219.99	610.33	26.	0.	.000	.00	.617D
RU-106	1245.06	622.79	12.	10.	.001	135.79	.656s
I-131	1274.68	637.52	5.	7.	.001	137.11	.483s
CS-137	1325.00	662.55	2.	1.	.000	346.41	.000s
ZR-95	1447.60	723.56	3.	1.	.000	452.15	.697s
ZR-95	1513.00	756.14	0.	0.	.000	.00	.000s
NB-95	1531.00	765.10	1.	0.	.000	200.00	.166s
CS-134	1589.00	794.01	3.	1.	.000	529.15	.156s
CO-58	1621.26	810.89	8.	10.	.001	145.14	.626s
MN-54	1669.24	834.02	3.	8.	.001	113.04	.623s
FE-59	2199.91	1099.25	9.	0.	.000	.00	2.205
ZN-65	2229.00	1113.82	1.	4.	.000	146.59	.175s
CO-60	2347.14	1173.03	3.	15.	.002	71.67	.569s
FE-59	2585.25	1292.53	2.	8.	.001	94.50	.655s
CO-60	2665.16	1332.68	2.	7.	.001	104.00	1.641s
K-40	2912.75	1457.25	0.	17.	.002	48.51	.755s
LA-140	3187.00	1595.50	0.	6.	.001	81.65	.505s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	< 4.1891E+01	5.0355E+01	
K-40	# 6.9992E+01	6.9992E+01	3.782E+01
MN-54	< 2.9172E+00	3.0103E+00	
FE-59	< 1.1791E+01	1.4697E+01	
CO-58	< 4.4393E+00	5.0905E+00	

CO-60	<	4.0623E+00	4.0830E+00
ZN-65	<	4.1401E+00	4.3099E+00
ZR-95	<	5.2623E+00	6.1333E+00
NB-95	<	2.1122E+00	2.7939E+00
RU-103	<	3.0760E+00	3.9487E+00
RU-106	<	4.1614E+01	4.2737E+01
I-131	<	3.5931E+00	1.2201E+01
CS-134	<	2.0110E+00	2.0391E+00
CS-137	<	3.0397E+00	3.0424E+00
BA-140	<	1.9112E+01	4.1214E+01
LA-140	<	4.9260E+00	1.0623E+01
CE-141	<	8.1364E+00	1.1002E+01
CE-144	<	3.4898E+01	3.6120E+01

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (65.9 to 2031.4 keV) 6.9992200E+01 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 6.9992200E+01 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 & CE-141	204.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 & RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 ? ZR-95	765.79 % NB-95	795.84 & CS-134	810.77 % CO-58
834.84 % MN-54	1115.55 & ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1596.18 % LA-140		

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction

Sum
7-12-07

Sample description
TXW-4130 3.5 LITER
27-JUN-2007 13:44 AMS

Spectrum Filename: C:\User\37442.Ani

Acquisition information
Start time 11-Jul-2007 15:56:14
Live time 7351
Real time 7360
Dead time .12%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration
Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	27-Jun-2007 13:44:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc
		18-Apr-2007 14:24:45
Absorption (Internal)	NO	

Energy calibration normalized difference: 1.0000

***** U N I D E N T I F I E D P E A K S U M M A R Y *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
703.63	351.77	83.	113.	8.762E+03	36.22	1.491	PB-214 s
1021.65	510.80	67.	152.	1.563E+04	27.72	2.327	TL-208 s
1218.45	609.22	22.	120.	1.404E+04	21.44	1.362	BI-214 D
2240.35	1120.22	18.	28.	5.164E+03	57.27	1.650	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** I D E N T I F I E D P E A K S U M M A R Y *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.52	133.18	176.	23.	.003	328.94	.796s
CE-141	292.41	146.12	84.	32.	.004	119.90	.885
I-131	569.53	284.71	50.	17.	.002	192.24	.643s
BA-140	610.71	305.30	42.	2.	.000	726.19	.512s
LA-140	659.53	329.72	48.	15.	.002	232.09	.667s
I-131	729.00	364.46	33.	3.	.000	602.22	.000s
BE-7	956.20	478.07	33.	16.	.002	117.80	.491s
LA-140	973.00	486.47	11.	4.	.000	213.81	.000s
RU-103	993.00	496.48	11.	0.	.000	663.32	.083s
BA-140	1074.00	536.98	9.	0.	.000	.00	.000s
CS-134	1209.42	604.70	18.	2.	.000	552.33	1.360D
RU-103	1220.68	610.33	53.	0.	.000	.00	.235D
RU-106	1245.17	622.58	13.	14.	.002	102.67	.552s
I-131	1274.00	637.00	6.	0.	.000	489.90	.000s
CS-137	1319.25	659.62	27.	7.	.001	268.02	.667s
ZR-95	1450.00	725.01	6.	1.	.000	529.15	.000s
ZR-95	1512.00	756.01	5.	0.	.000	447.21	.083s
NB-95	1530.53	765.28	9.	3.	.000	231.52	.432s
CS-134	1591.00	795.55	13.	5.	.001	229.37	1.029
CO-58	1621.59	810.81	9.	1.	.000	724.19	.685s
MN-54	1665.07	832.55	11.	3.	.000	415.69	.349s
FE-59	2196.25	1098.17	7.	11.	.001	114.90	1.335
ZN-65	2230.99	1115.55	6.	1.	.000	1113.35	1.648D
CO-60	2344.25	1172.18	4.	8.	.001	112.00	.625s
FE-59	2585.55	1292.83	4.	2.	.000	323.21	.543s
CO-60	2653.58	1331.86	2.	1.	.000	447.21	.673s
K-40	2920.95	1460.55	9.	72.	.010	30.60	1.190s
LA-140	3192.20	1596.10	0.	19.	.003	45.88	.583s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	ACTIVITY	ACTIVITY	UNCERTAINTY	2 SIGMA
		pCi/LITER	pCi/LITER	COUNTING	
BE-7	<	2.8222E+01	3.3900E+01		
K-40	#	9.2166E+01	9.2166E+01	4.846E+01	
MN-54	<	2.5739E+00	2.6557E+00		
FE-59	<	4.5246E+00	5.6349E+00		
CO-58	<	2.4036E+00	2.7591E+00		
CO-60	<	2.7449E+00	2.7588E+00		
ZN-65	<	4.4703E+00	4.6530E+00		
ZR-95	<	3.6577E+00	4.2606E+00		
NB-95	<	2.1102E+00	2.7987E+00		
RU-103	<	2.2411E+00	2.8742E+00		
RU-106	<	2.4157E+01	2.4807E+01		
I-131	<	3.4030E+00	1.1501E+01		
CS-134	<	2.6894E+00	2.7245E+00		
CS-137	<	3.8676E+00	3.8711E+00		
BA-140	<	8.3698E+00	1.7996E+01		
LA-140	#	4.9294E+00	1.2558E+01	4.959E+00	< 7.2762 E+00 <i>Spt. Hsp. W/C</i>
CE-141	<	4.6973E+00	6.3441E+00		
CE-144	<	3.0348E+01	3.1406E+01		

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 9.7095490E+01 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 1.0276460E+02 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	204.30 % I-131	304.84 % BA-140
328.76 & LA-140	364.40 % I-131	477.61 % BE-7	487.02 % LA-140
497.00 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 & RU-103
621.84 & RU-106	636.97 % I-131	661.66 & CS-137	724.10 & ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 & MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 & CO-60
1291.60 & FE-59	1332.50 % CO-60		

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.

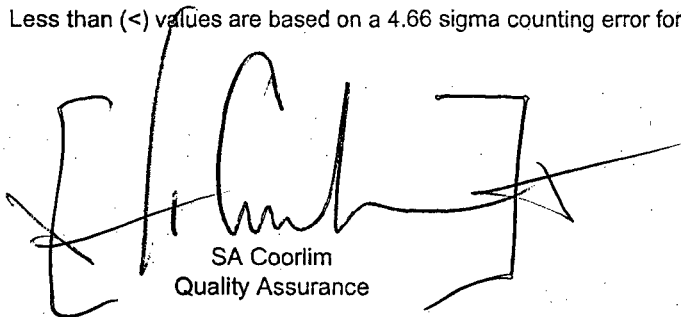


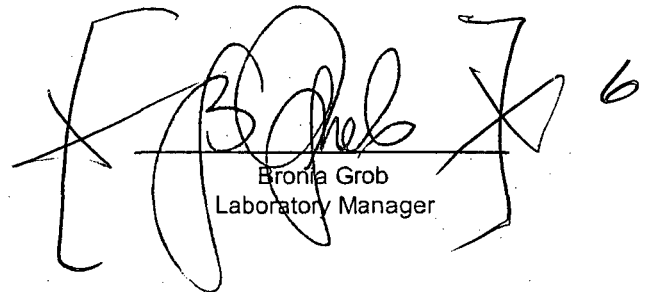
6
~~Mr. Al Percival~~
~~FirstEnergy Corporation~~
~~Mail Stop 1041~~
5501 North State Route 2
Oak Harbor, Ohio 43449

LABORATORY REPORT NO.: 8003-100-366
DATE: 08-13-07
SAMPLES RECEIVED: 08-08-07
PURCHASE ORDER NO.:

Sample ID	Lab Code	Collection Date	H-3 (pCi/L)	LLD
MW-31S	TXW-5194	07/31/07	7322 ± 262	< 176
MW-31D	TXW-5195	07/31/07	108 ± 97	< 176
MW-32S	TXW-5196	07/31/07	7535 ± 265	< 176
MW-32D	TXW-5199	07/31/07	507 ± 113	< 176
MW-33S	TXW-5200	07/31/07	2702 ± 175	< 176
MW-33D	TXW-5201	07/31/07	3271 ± 178	< 173
MW-34S	TXW-5202	07/31/07	2839 ± 169	< 173
MW-34D	TXW-5203	07/31/07	1076 ± 126	< 173
MW-30S	TXW-5204	07/31/07	1149 ± 128	< 173
MW-30D	TXW-5205	07/31/07	231 ± 100	< 173
MW-37S	TXW-5206	07/31/07	2961 ± 171	< 173
MW-37D	TXW-5207	07/31/07	135 ± 96	< 173
MW-12S	TXW-5208	07/31/07	860 ± 120	< 173
MW-12D	TXW-5209	07/31/07	1155 ± 128	< 173
DBD-01	TXW-5197	07/31/07	7185 ± 260	< 176
DBD-01 (duplicate)	TXW-5198	07/31/07	7734 ± 268	< 176

The error given is the probable counting error at the 95% confidence level.
Less than (<) values are based on a 4.66 sigma counting error for the background sample.


SA Coorlim
Quality Assurance


Bronia Grob
Laboratory Manager

SAMPLE ANALYSIS REQUEST / CHAIN OF CUSTODY
FORM X-2189 (REV. 05-07)

CHAIN OF CUSTODY REQUIRED?

YES NO

PAGE 1 OF 1

COMPANY NAME FENOC		TURN AROUND TIME (Surcharges May Apply)		ANALYSIS REQUESTED								SAMPLE MATRIX	
ADDRESS / LOCATION DAVIS BESSE GROUNDWATER		<input type="checkbox"/> SAME DAY		P R E S E R V A T I V E T R I T I U M								A = ASBESTOS AS = FILTER-ARSENIC F = FUEL OIL & COAL M = METAL O = OIL P = LEAD IN PAINT W = WATER OT = OTHER	
BILLING ADDRESS DB		<input type="checkbox"/> 24 HOURS											
CITY OAK HARBOR		<input type="checkbox"/> 48 HOURS											
STATE OHIO		<input type="checkbox"/> STANDARD											
TELEPHONE NO. 419-321-7883		FAX NO.										SAMPLE REMARKS: (Conditions, Bottle Type, Etc.)	
REPORT ATTENTION AL PERGUAL		E-MAIL AMERICA@FIRSTENERGY.COM											
PURCHASE ORDER NO. 1		RESULTS											
		<input type="checkbox"/> MAIL										LAB I.D.	
		<input type="checkbox"/> FAX											
		<input checked="" type="checkbox"/> E-MAIL											

SAMPLE IDENTIFICATION	MATRIX	COLLECTION DATE	COLLECTION TIME															
MW-315	WATER	7/31/07	1214-1216															
MW-31D	"	"	1345-1348															
MW-325	"	"	1516-1522															
DBD-01	"	"	---															

RELINQUISHED BY (Signature) <i>Andy Lamb-Monahan</i>	DATE 7/31/07	TIME 1529	RECEIVED BY (Signature) <i>Mark A. Kato</i>	DATE 7/31/07	TIME 1529	ADDITIONAL COMMENTS:
RELINQUISHED BY (Signature) <i>Mark A. Kato</i>	DATE 08/7/07	TIME 0830	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 08-07-07	TIME 0830	
RELINQUISHED BY (Signature) <i>[Signature]</i>	DATE 08-07-07	TIME	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 08/8/07	TIME 1000	

Environmental, Inc.

Midwest Laboratory
an Allegheny Technologies Co.
PRG-33

Version No. 1.0 06/17/97
Programmed by Rick Lesko

TRITIUM

RESULTS SHEET

For any sample counted on the LSP-2550TRI/AB,
LSP-2000CA or LSP-2800TR

Smc

Reviewed and Approved by: _____

Date approved: 8-13-07

Sample Count Time (min.): 100
Background Count Time (min.): 200
Background Counts: 874

Standard Count Time (min.): 200
Standard Counts: 61036
Counter Efficiency: 0.195

Date Counted: 8/10/2007
Calculated by: Tony
Date Calculated: 8/13/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00 Sigma	4.66 Sigma
					Activity	± Error			
TXW-5201	8/2/2007	13.0	2276	0.999	3270.792	± 177.661	478.994	111.541	173.260
TXW-5202	8/2/2007	13.0	2033	0.999	2838.599	± 168.786	421.335	111.541	173.260
TXW-5203	8/2/2007	13.0	1042	0.999	1076.035	± 126.291	193.300	111.541	173.260
TXW-5204	8/2/2007	13.0	1083	0.999	1148.957	± 128.329	202.200	111.541	173.260
TXW-5205	8/3/2007	13.0	567	0.999	231.179	± 99.680	104.521	111.523	173.233
TXW-5206	8/3/2007	13.0	2102	0.999	2960.865	± 171.327	437.610	111.523	173.233
TXW-5207	8/6/2007	13.0	513	0.999	135.088	± 96.148	97.888	111.472	173.153
TXW-5208	8/6/2007	13.0	921	0.999	860.299	± 120.003	167.600	111.472	173.153
TXW-5209	8/6/2007	13.0	1087	0.999	1155.360	± 128.447	202.948	111.472	173.153

=Best probable result.

Environmental, Inc.
Midwest Laboratory
 an Allegheny Technologies Co.
 PRG-33
 Version No. 1.0 06/17/97
 Programmed by Rick Lesko

TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: Jac
 Date approved: 8-13-07

Sample Count Time (min.): 100	Standard Count Time (min.): 200	Date Counted: 8/10/2007
Background Count Time (min.): 200	Standard Counts: 52906	Calculated by: Tony
Background Counts: 681	Counter Efficiency: 0.169	Date Calculated: 8/13/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00 Sigma	4.66 Sigma
					Activity	± Error			
TXW-5194	7/31/2007	13.0	3913	0.998	7321.848	± 261.928	1029.644	113.456	176.235
TXW-5195	7/31/2007	13.0	393	0.998	107.599	± 97.281	98.376	113.456	176.235
TXW-5196	7/31/2007	13.0	4017	0.998	7534.996	± 265.242	1058.530	113.456	176.235
TXW-5197	7/31/2007	13.0	3846	0.998	7184.531	± 259.770	1011.038	113.456	176.235
TXW-5198	7/31/2007	13.0	4114	0.998	7733.798	± 268.297	1085.477	113.456	176.235
TXW-5199	8/1/2007	13.0	588	0.999	507.174	± 112.854	132.264	113.439	176.208
TXW-5200	8/1/2007	13.0	1659	0.999	2701.854	± 175.286	407.120	113.439	176.208
TXW-5194	7/31/2007	13.0	3908	0.998	7311.600	± 261.767	1028.255	113.456	176.235

Best probable result.

SAMPLE ANALYSIS REQUEST / CHAIN OF CUSTODY
FORM X-2189 (REV. 05-07)

6670 BETA DRIVE, MAYFIELD VILLAGE, OHIO 44143
1-800-470-BETA 440-604-9802 FAX 440-604-9800

CHAIN OF CUSTODY REQUIRED?

YES NO

PAGE 1 OF 1

COMPANY NAME FENOC ADDRESS / LOCATION DAVIS BESSE GROUNDWATER BILLING ADDRESS DB			TURN AROUND TIME (Surcharges May Apply) <input type="checkbox"/> SAME DAY <input type="checkbox"/> 24 HOURS <input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD			ANALYSIS REQUESTED										SAMPLE MATRIX A = ASBESTOS AS = FILTER-ARSENIC F = FUEL OIL & COAL M = METAL O = OIL P = LEAD IN PAINT W = WATER OT = OTHER				
CITY OAK HARBOR		STATE OHIO	ZIP CODE 43449		P R E S E R V A T I V E	TRITIUM										SAMPLE REMARKS: (Conditions, Bottle Type, Etc.)		LAB I.D.		
TELEPHONE NO. 419-321-7883		FAX NO.		RESULTS <input type="checkbox"/> MAIL <input type="checkbox"/> FAX <input checked="" type="checkbox"/> E-MAIL																
REPORT ATTENTION AL PERCIVAL		E-MAIL ALPERCIVAL@FIRSTENERGY.COM		PURCHASE ORDER NO.																
SAMPLE IDENTIFICATION		MATRIX	COLLECTION DATE	COLLECTION TIME																
mw 33D		W	8/2/07	1225																
mw 34S		W	8/2/07	1418																
mw 34D		W	8/2/07	1600																
mw 30S		W	8/2/07	1845																
RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)		DATE	TIME	ADDITIONAL COMMENTS:												
<i>[Signature]</i>		8/2/07	1925	<i>[Signature]</i>		8/2/07	1926													
RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)		DATE	TIME													
<i>[Signature]</i>		8/7/07	0830	<i>[Signature]</i>		8/7/07	0830													
RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)		DATE	TIME													
<i>[Signature]</i>		8-07-07	0830	<i>[Signature]</i>																

8/2/07 1926

11-17-15
14-17-14-0



BETA LABORATORY

6670 BETA DRIVE, MAYFIELD VILLAGE, OHIO 44143
1-800-470-BETA 440-604-9802 FAX 440-604-9800

SAMPLE ANALYSIS REQUEST / CHAIN OF CUSTODY
FORM X-2189 (REV. 05-07)

CHAIN OF CUSTODY REQUIRED? YES NO

PAGE 1 OF 1

COMPANY NAME FE-OC		TURN AROUND TIME (Surcharges May Apply) <input type="checkbox"/> SAME DAY <input type="checkbox"/> 24 HOURS <input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD		ANALYSIS REQUESTED										SAMPLE MATRIX				
ADDRESS / LOCATION DAVIS BASSE GROUNDWATER				PRESERVATIVE TRITIUM										A = ASBESTOS AS = FILTER-ARSENIC F = FUEL OIL & COAL M = METAL O = OIL P = LEAD IN PAINT W = WATER OT = OTHER				
BILLING ADDRESS DB																		
CITY DAK HARBOR	STATE OHIO	ZIP CODE 43449												SAMPLE REMARKS: (Conditions, Bottle Type, Etc.)		LAB I.D.		
TELEPHONE NO. 419-321-7883	FAX NO.																	
REPORT ATTENTION AL PERCIVAL		E-MAIL ALPERCIVAL@FIRSTENERGY.COM																
PURCHASE ORDER NO.		CORP. CO.																
SAMPLE IDENTIFICATION		MATRIX	COLLECTION DATE	COLLECTION TIME														
MW 32D		W	8-1-07	1147-1317-1150														
MW 33S		W	8-1-07	1447-1245-1150														

RELINQUISHED BY (Signature) <i>[Signature]</i>	DATE 8/1/07	TIME 1600	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 8/1/07	TIME 1605	ADDITIONAL COMMENTS:
RELINQUISHED BY (Signature) <i>[Signature]</i>	DATE 8/1/07	TIME 0830	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 8/8/07	TIME 0830	
RELINQUISHED BY (Signature) <i>[Signature]</i>	DATE 8/8/07	TIME 0830	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 8/8/07	TIME 1000	

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6670 BETA DRIVE, MAYFIELD VILLAGE, OHIO 44143
1-800-470-BETA 440-604-9802 FAX 440-604-9800

SAMPLE ANALYSIS REQUEST / CHAIN OF CUSTODY

FORM X-2189 (REV. 05-07)

CHAIN OF CUSTODY REQUIRED?

YES NO

PAGE 1 OF 1

COMPANY NAME <i>Davis Besse Fe noc</i>		TURN AROUND TIME (Surcharges May Apply) <input type="checkbox"/> SAME DAY <input type="checkbox"/> 24 HOURS <input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD		ANALYSIS REQUESTED										SAMPLE MATRIX A = ASBESTOS AS = FILTER-ARSENIC F = FUEL OIL & COAL M = METAL O = OIL P = LEAD IN PAINT W = WATER OT = OTHER				
ADDRESS / LOCATION <i>Davis Besse Groundwater</i>				PRESERVATIVE <i>Tritium</i>										SAMPLE REMARKS: (Conditions, Bottle Type, Etc.)		LAB I.D.		
BILLING ADDRESS																		
CITY <i>Davis Besse Ohio</i>	STATE <i>Ohio</i>	ZIP CODE <i>43449</i>																
TELEPHONE NO. <i>419-321-7883</i>	FAX NO.	RESULTS <input type="checkbox"/> MAIL <input type="checkbox"/> FAX <input checked="" type="checkbox"/> E-MAIL																
REPORT ATTENTION <i>AL Personal</i>		E-MAIL <i>al.personal@firstenergy.com</i>																
PURCHASE ORDER NO.																		
SAMPLE IDENTIFICATION		MATRIX	COLLECTION DATE	COLLECTION TIME														
<i>MW 37D</i>		<i>W</i>	<i>8-6-07</i>	<i>1105-1108</i>														
<i>MW 12S</i>		<i>W</i>	<i>8-6-07</i>	<i>1352-1355</i>														
<i>MW 12D</i>		<i>W</i>	<i>8-6-07</i>	<i>1543-1547</i>														

RELINQUISHED BY (Signature) <i>Al Personal</i>	DATE <i>8-6-07</i>	TIME <i>1610</i>	RECEIVED BY (Signature) <i>Al Personal</i>	DATE <i>8-6-07</i>	TIME <i>1611</i>	ADDITIONAL COMMENTS:
RELINQUISHED BY (Signature) <i>Al Personal</i>	DATE <i>8/7/07</i>	TIME <i>0830</i>	RECEIVED BY (Signature) <i>Al Personal</i>	DATE <i>8/7/07</i>	TIME <i>0830</i>	
RELINQUISHED BY (Signature) <i>Al Personal</i>	DATE <i>8/8/07</i>	TIME <i>0830</i>	RECEIVED BY (Signature) <i>Al Personal</i>	DATE <i>8/8/07</i>	TIME <i>1000</i>	

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BETA LABORATORY

6670 BETA DRIVE, MAYFIELD VILLAGE, OHIO 44143
1-800-470-BETA 440-604-9802 FAX 440-604-9800

SAMPLE ANALYSIS REQUEST / CHAIN OF CUSTODY
FORM X-2189 (REV. 05-07)

CHAIN OF CUSTODY REQUIRED?
 YES NO

PAGE 1 OF 1

COMPANY NAME FEJOC		TURN AROUND TIME (Surcharges May Apply) <input type="checkbox"/> SAME DAY <input type="checkbox"/> 24 HOURS <input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD		ANALYSIS REQUESTED										SAMPLE MATRIX		
ADDRESS / LOCATION DAVIS Besse Groundwater				PRESERVATIVE TRITIUM										A = ASBESTOS AS = FILTER-ARSENIC F = FUEL OIL & COAL M = METAL O = OIL P = LEAD IN PAINT W = WATER OT = OTHER		
BILLING ADDRESS DB																
CITY OAK HARBOR	STATE OHIO	ZIP CODE 43449												SAMPLE REMARKS: (Conditions, Bottle Type, Etc.)		
TELEPHONE NO. 419-321-7883		FAX NO.												LAB I.D.		
REPORT ATTENTION AL PERCIVAL		E-MAIL ALPERCIVAL@firstenergy.com														
PURCHASE ORDER NO.																
SAMPLE IDENTIFICATION		MATRIX	COLLECTION DATE	COLLECTION TIME												
MW 300		W	8/31/07	1030												
MW 375		W	8/31/07	1405												

RELINQUISHED BY (Signature) <i>[Signature]</i>	DATE 8/31/07	TIME 1531	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 8/31/07	TIME 1532	ADDITIONAL COMMENTS:
RELINQUISHED BY (Signature) <i>[Signature]</i>	DATE 8/7/07	TIME 0730	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 8-7-07	TIME 0830	
RELINQUISHED BY (Signature) <i>[Signature]</i>	DATE 08-07-07	TIME 0830	RECEIVED BY (Signature) <i>[Signature]</i>	DATE 8/7/07	TIME 1000	

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Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

700 Landwehr Road • Northbrook, IL 60062-2310
ph. (847) 564-0700 • fax (847) 564-4517

6
Mr. Al Percival
FirstEnergy Corporation
Mail Stop 1041
5501 North State Route 2
Oak Harbor, Ohio 43449

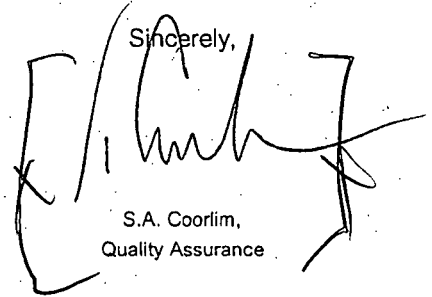
LABORATORY REPORT NO.: 8003-100-370
DATE: 11-06-07
SAMPLES RECEIVED: 10-06-07
PURCHASE ORDER NO.:

Dear Mr. Percival

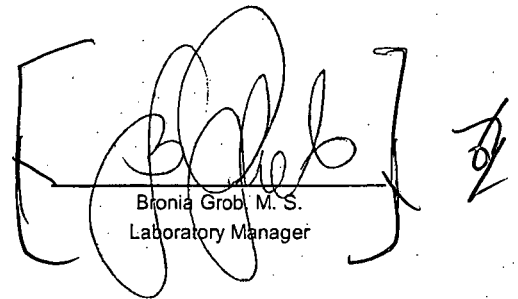
Enclosed are results of the analyses for tritium and gamma-emitting isotopes in twenty-two ground water samples.

Should you have any questions or other concerns, please do not hesitate to call.

Sincerely,



S.A. Coorlim,
Quality Assurance



Bronia Grob, M.S.
Laboratory Manager

SAMPLES RETAINED THIRTY DAYS AFTER ANALYSIS

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MW-102B	MW-102C	MW-100A	MS02MW100A	MSD02MW100A
Date Collected	9/27/2007	9/27/2007	9/24/2007	9/24/2007	9/24/2007
Time Collected	10:59	15:05	14:50	14:50	14:50
Lab Code	TWW- 6749	TWW- 6750	TWW- 6751	TWW- 6752 ^a	TWW- 6753 ^a
Isotope	Concentration (pCi/L)				
H-3	394 ± 114	< 193	< 193	16321 ± 369	16925 ± 375
Mn-54	< 2.2	< 3.8	< 2.5	< 2.3	< 2.5
Fe-59	< 5.7	< 8.2	< 3.3	< 4.7	< 3.7
Co-58	< 1.9	< 3.2	< 2.3	< 2.3	< 2.5
Co-60	< 1.6	< 3.6	< 2.3	< 2.1	< 1.1
Zn-65	< 3.9	< 7.2	< 2.9	< 1.9	< 4.1
Zr-Nb-95	< 2.7	< 3.5	< 2.3	< 3.3	< 3.4
Cs-134	< 2.5	< 3.2	< 2.0	< 3.0	< 2.6
Cs-137	< 2.8	< 3.8	< 2.3	68.6 ± 7.6	70.2 ± 7.5
Ba-La-140	< 5.8	< 7.2	< 4.1	< 4.1	< 2.1

Sample Location	MW-101A	MW-101B	MW-101C	RINSEATE BLANK	MW-103C
Date Collected	10/2/2007	10/2/2007	10/2/2007	10/2/2007	10/2/2007
Time Collected	10:23	11:49	14:20	14:40	15:07
Lab Code	TWW- 6754	TWW- 6755	TWW- 6756	TWW- 6757	TWW- 6758
Isotope	Concentration (pCi/L)				
H-3	237 ± 89	207 ± 108	< 193	< 149	< 149
Mn-54	< 3.9	< 3.1	< 6.8	< 3.1	< 5.8
Fe-59	< 7.3	< 5.8	< 8.7	< 4.5	< 6.7
Co-58	< 5.5	< 2.4	< 4.3	< 2.8	< 4.2
Co-60	< 2.9	< 3.3	< 3.8	< 1.8	< 5.6
Zn-65	< 5.0	< 3.5	< 11.8	< 2.4	< 7.7
Zr-Nb-95	< 4.4	< 4.0	< 4.3	< 3.5	< 2.7
Cs-134	< 5.3	< 2.9	< 4.3	< 3.4	< 5.7
Cs-137	< 6.8	< 3.7	< 6.0	< 2.8	< 6.3
Ba-La-140	< 9.8	< 5.5	< 6.4	< 4.9	< 5.7

^a Known spike activ Cs-137, 65.6 pCi/L.

H-3, 17185 pCi/L.

The error given is the probable counting error at the 95% confidence level.

Less than (<), value is based on a 4.66 sigma counting error for the background sample.

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MW-100C	MW-100B	MW-102A	MW-102A	MW-103A
Date Collected	9/25/2007	9/25/2007	9/25/2007	9/25/2007	10/1/2007
Time Collected	11:06	0:00	15:21	15:21	10:31
Lab Code	TWW- 6759	TWW- 6760	TWW- 6761	TWW- 6762	TWW- 6763
Isotope	Concentration (pCi/L)				
H-3	< 149	< 193	344 ± 113	387 ± 114	495 ± 117
Mn-54	< 2.9	< 3.9	< 2.3	< 1.8	< 3.4
Fe-59	< 2.0	< 5.6	< 4.9	< 5.2	< 9.0
Co-58	< 3.3	< 3.9	< 3.1	< 2.1	< 6.6
Co-60	< 2.4	< 3.6	< 2.9	< 2.2	< 1.8
Zn-65	< 4.2	< 8.4	< 5.5	< 2.8	< 7.8
Zr-Nb-95	< 2.8	< 5.2	< 4.7	< 3.1	< 5.7
Cs-134	< 2.9	< 3.6	< 3.1	< 2.5	< 4.8
Cs-137	< 2.3	< 3.5	< 2.1	< 2.0	< 5.8
Ba-La-140	< 5.5	< 8.3	< 9.4	< 3.6	< 10.9

Sample Location	MW-103B	DBD-04	MW-104A	MW-104B	MW-104C
Date Collected	10/1/2007	10/1/2007	9/28/2007	9/28/2007	9/28/2007
Time Collected	12:30	12:00	10:07	11:42	14:42
Lab Code	TWW- 6764	TWW- 6765	TWW- 6766	TWW- 6767	TWW- 6768
Isotope	Concentration (pCi/L)				
H-3	362 ± 113	394 ± 95	237 ± 89	250 ± 89	< 193
Mn-54	< 3.3	< 4.5	< 1.6	< 2.4	< 2.5
Fe-59	< 5.8	< 7.7	< 5.0	< 6.4	< 6.6
Co-58	< 3.5	< 2.5	< 2.1	< 1.9	< 1.8
Co-60	< 3.5	< 3.6	< 2.6	< 2.1	< 1.4
Zn-65	< 4.9	< 4.4	< 3.1	< 2.0	< 3.8
Zr-Nb-95	< 5.0	< 4.9	< 3.8	< 2.8	< 3.5
Cs-134	< 4.8	< 5.4	< 2.9	< 3.2	< 3.3
Cs-137	< 3.8	< 4.8	< 3.3	< 2.6	< 3.6
Ba-La-140	< 8.2	< 8.6	< 6.6	< 4.4	< 2.5

The error given is the probable counting error at the 95% confidence level.

Less than (<), value is based on a 4.66 sigma counting error for the background sample.

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MW-35S	MW-35D
Date Collected	10/3/2007	10/3/2007
Time Collected	10:26	13:00
Lab Code	TWW- 6769	TWW- 6770
Isotope	Concentration (pCi/L)	
H-3	227 ± 88	368 ± 94
Mn-54	< 2.9	< 1.8
Fe-59	< 4.4	< 5.0
Co-58	< 3.7	< 2.2
Co-60	< 3.3	< 1.6
Zn-65	< 3.5	< 5.6
Zr-Nb-95	< 3.9	< 3.1
Cs-134	< 4.5	< 3.9
Cs-137	< 4.7	< 2.0
Ba-La-140	< 5.0	< 2.5

The error given is the probable counting error at the 95% confidence level.
Less than (<), value is based on a 4.66 sigma counting error for the background sample.

Environmental, Inc.
Midwest Laboratory
 an Allegheny Technologies Co.
 PRG-33
 Version No. 1.0 06/17/97
 Programmed by Rick Lesko

TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

JMC

Reviewed and Approved by:

Date approved:

11-6-07

Sample Count Time (min.): 100
 Background Count Time (min.): 200
 Background Counts: 732

Standard Count Time (min.): 200
 Standard Counts: 55038
 Counter Efficiency: 0.178

Date Counted: 11/3/2007
 Calculated by:
 Date Calculated: 11/5/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00	4.66
					Activity ± Error	Sigma		Sigma	
TWW-6752	9/24/2007	13.0	8717	0.994	16320.983 ± 368.751		2250.075	112.168	174.235
TWW-6753	9/24/2007	13.0	9026	0.994	16924.885 ± 375.097		2332.147	112.168	174.235
TWW-7185	10-8-2007	13.0	14157	0.996	26894.847 ± 467.066		3687.399	111.927	173.860
TWW-7186	10-8-2007	13.0	14595	0.996	27749.023 ± 474.145		3803.536	111.927	173.860

☞ =Best probable result.

Sample description
TWW-7166 3.5 LITER
09-OCT-2007 12:00 EG

Sum
11-1-07

Spectrum Filename: C:\User\17738.Anl

Acquisition information

Start time 27-Oct-2007 10:41:52
Live time 11234
Real time 11247
Dead time .12%
Detector/Geometry IDs 1 & 0

Detector system
MCE 1 Input 1

Calibration

Filename: d1g1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:50
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.0571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	09-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 14W02.96 27-OCT-2007 13:49:15 Page 2
Environmental Inc Spectrum name: 17738.Anl

Energy calibration normalized difference: .2044

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY % AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1220.15	609.27	73.	105.	1.218E+04	30.26	1.847	BI-214 D
2240.12	1120.26	36.	35.	6.213E+03	59.40	2.091	BI-214 D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	270.53	133.54	279.	0.	.000	.00	1.640D
CE-141	294.28	145.44	450.	36.	.003	170.23	1.645D
I-131	572.41	284.77	127.	11.	.001	295.90	.706s
BA-140	614.49	305.05	141.	30.	.003	113.00	1.029s
LA-140	657.45	327.37	100.	34.	.003	140.11	.569s
I-131	732.15	364.79	120.	15.	.001	271.62	.503s
BE-7	950.24	470.06	01.	12.	.001	266.15	1.032s
LA-140	970.01	487.96	112.	40.	.004	110.60	.755s
RU-103	996.00	496.90	24.	0.	.000	979.00	.000s
BA-140	1075.76	536.93	26.	4.	.000	329.05	.653s
CS-134	1211.03	604.70	36.	2.	.000	011.00	1.045D
RU-103	1222.27	610.33	159.	15.	.001	236.94	1.040D
RU-106	1244.96	621.70	40.	30.	.003	101.40	.753s
I-131	1274.99	636.74	30.	9.	.001	205.69	1.303
CS-137	1323.00	660.00	13.	1.	.000	640.31	.225s
ZR-95	1449.00	723.92	15.	1.	.000	1019.00	.000s
ZR-95	1512.04	755.90	22.	10.	.001	159.57	1.347
NB-95	1531.26	765.13	40.	44.	.004	70.73	.664s
CS-134	1590.74	794.93	37.	15.	.001	159.63	.934s
CO-58	1619.19	009.10	30.	20.	.002	131.15	.466s
MN-54	1669.09	034.10	40.	4.	.000	671.50	.704s
FE-59	2197.29	1090.01	20.	17.	.001	140.02	.502s
ZN-65	2230.70	1115.55	21.	0.	.000	4760.57	2.000D
CO-60	2346.53	1173.50	23.	9.	.001	205.12	.640s
FE-59	2503.00	1292.05	5.	0.	.000	447.21	.000s
CO-60	2664.14	1332.70	13.	20.	.002	71.05	1.779s
K-40	2920.76	1461.27	32.	341.	.030	13.91	1.923
LA-140	3190.00	1596.17	1.	1.	.000	200.00	.200s

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

	pCi/LITER	pCi/LITER	pCi/LITER
BE-7 <	2.8605E+01	3.6127E+01	
K-40	3.3574E+02	3.3574E+02	6.620E+01
MN-54 <	3.0939E+00	3.2197E+00	
FE-59 <	5.8162E+00	7.6915E+00	
CO-58 <	2.8573E+00	3.4060E+00	
CO-60 <	2.8200E+00	2.8383E+00	
ZN-65 <	5.1514E+00	5.4209E+00	
ZR-95 <	4.3600E+00	5.3047E+00	
NB-95 <	3.3226E+00	4.7377E+00	
RU-103 <	1.7925E+00	2.4608E+00	
RU-106 <	2.9135E+01	3.0136E+01	
I-131 <	3.6800E+00	1.7352E+01	
CS-134 <	2.2607E+00	2.3064E+00	
CS-137 <	2.0627E+00	2.0650E+00	
BA-140 <	7.9814E+00	2.1157E+01	
LA-140 <	2.4490E+00	6.4917E+00	
CE-141 <	7.8081E+00	1.1449E+01	
CE-144 <	2.7752E+01	2.9021E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 3.3574090E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 3.3574090E+02 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

145.44 % CE-141	284.30 % I-131	304.84 % BA-140	328.76 % LA-140
364.48 % I-131	477.61 % BE-7	487.02 % LA-140	497.08 % RU-103
537.32 % BA-140	604.70 % CS-134	610.33 % RU-103	621.84 % RU-106
636.97 % I-131	661.66 % CS-137	724.18 % ZR-95	756.72 % ZR-95
765.79 % NB-95	795.84 % CS-134	810.77 % CO-58	834.84 % MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1596.18 % LA-140		

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-7167 3.5 LITER
09-OCT-2007 12:00 BG

Sum
11/1/07

Spectrum Filename: C:\User\37752.Anl

Acquisition information
Start time 27-Oct-2007 10:45:25
Live time 11308
Real time 11321
Dead time .12%
Detector/Geometry IDs 3 & 0

Detector system
MCE 1 Input 3

Calibration
Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset: -.110 keV; Gain .500 keV/channel
Quadratic: -.125E-07 keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 59.90keV
Stop channel 4040 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	09-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Energy calibration normalized difference: .0374

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY % AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
105.71	92.76	234.	191.	1.252E+04	50.19	1.350	TH-234 s
704.23	352.07	139.	137.	1.065E+04	37.24	1.152	PB-214
1021.27	510.61	100.	164.	1.685E+04	30.75	1.890	TL-208 s
1218.77	609.30	23.	140.	1.737E+04	18.85	1.363	BI-214 D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.66	133.24	180.	29.	.003	229.67	.827
CE-141	291.00	145.42	71.	10.	.001	312.97	.500s
I-131	570.63	285.25	90.	8.	.001	585.23	.560s
BA-140	611.35	305.62	70.	37.	.003	124.09	.729s
LA-140	657.00	320.45	51.	2.	.000	860.44	.542s
I-131	727.57	363.74	39.	21.	.002	152.00	1.057
BE-7	954.00	476.97	16.	2.	.000	549.75	.233s
LA-140	972.93	486.44	23.	5.	.000	282.84	.873
RU-103	990.00	494.98	38.	11.	.001	169.59	.177s
BA-140	1077.82	530.89	37.	13.	.001	167.27	.810s
CS-134	1209.42	604.70	35.	13.	.001	136.48	1.360D
RU-103	1220.60	610.33	97.	0.	.000	.00	.256D
RU-106	1246.13	623.06	11.	8.	.001	136.93	.993
I-131	1274.00	637.00	18.	4.	.000	316.23	.000s
CS-137	1320.00	660.00	13.	6.	.001	186.39	.146s
ZR-95	1445.42	722.72	28.	18.	.002	124.32	2.562s
ZR-95	1514.12	757.07	15.	9.	.001	150.57	.409s
NB-95	1532.00	766.01	19.	1.	.000	1249.00	.000s
CS-134	1589.00	794.52	27.	8.	.001	236.64	.100s
CO-58	1622.00	811.02	9.	0.	.000	689.61	.000s
MN-54	1668.65	834.35	15.	13.	.001	122.88	.534s
FE-59	2194.95	1097.52	8.	11.	.001	109.42	.532s
ZN-65	2229.53	1114.81	22.	14.	.001	145.16	.719s
CO-60	2346.00	1173.05	9.	2.	.000	581.03	.000s
FE-59	2581.71	1290.92	4.	7.	.001	110.66	.986s
CO-60	2664.50	1332.31	2.	0.	.000	282.84	.583s
K-40	2921.61	1460.88	7.	41.	.004	41.87	1.752
LA-140	3192.00	1596.00	2.	1.	.000	346.41	.188s

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	1.6401E+01	2.0715E+01
K-40	<	5.0240E+01	5.0240E+01
MN-54	<	1.9817E+00	2.0623E+00
FE-59	<	2.9300E+00	3.8749E+00
CO-58	<	1.4700E+00	1.7610E+00
CO-60	<	1.8693E+00	1.8814E+00
ZN-65	<	5.3705E+00	5.6515E+00
ZR-95	<	3.8000E+00	4.6240E+00
NB-95	<	1.9673E+00	2.8053E+00
RU-103	<	2.2709E+00	3.1176E+00
RU-106	<	1.8056E+01	1.9504E+01
I-131	<	2.0044E+00	9.4534E+00
CS-134	<	2.2374E+00	2.2747E+00
CS-137	<	2.0430E+00	2.0453E+00
BA-140	<	3.5936E+00	2.2703E+01
LA-140	<	1.2209E+00	3.2366E+00
CE-141	<	2.9042E+00	4.2586E+00
CE-144	<	2.0499E+01	2.1413E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	204.30 & I-131	304.04 & BA-140
320.76 % LA-140	364.40 & I-131	477.61 % BE-7	487.02 % LA-140
497.08 & RU-103	537.32 & BA-140	604.70 % CS-134	610.33 & RU-103
621.04 & RU-106	636.97 % I-131	661.66 & CS-137	724.10 & ZR-95
756.72 % ZR-95	765.79 % NB-95	795.04 & CS-134	810.77 % CO-58
834.04 % MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.01 % K-40	1596.10 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description

TWW-7168 3.5 LITER
09-OCT-2007 12:00 BG

*Sum
11-1-07*

Spectrum Filename: C:\User\87711.Ani

Acquisition information

Start time 27-Oct-2007 10:51:21
Live time 11579
Real time 11502
Dead time .03%
Detector/Geometry IDs 0 & 0

Detector system

MCE 5 Input 4

Calibration

Filename: D8g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset: .105 keV; Gain .500 keV/channel
Quadratic: .293E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:
RISØ method

Additional random error: 1.00000000E+00
Additional systematic error: 1.00000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	09-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	blk&w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 27-OCT-2007 14:04:20 Page 2
Environmental Inc Spectrum name: 07711.Anl

Energy calibration normalized difference: .2245

```
***** UNIDENTIFIED PEAK SUMMARY *****
PEAK CENTROID BACKGROUND NET AREA EFFICIENCY UNCERT FWHM SUSPECTED
CHANNEL ENERGY COUNTS COUNTS * AREA 2 SIGMA % keV NUCLIDE
-----
1021.00 510.98 77. 251. 2.060E+04 20.00 2.432 TL-208 s
```

s Peak fails shape tests.
D Peak area deconvoluted.

```
***** IDENTIFIED PEAK SUMMARY *****
NUCLIDE PEAK CENTROID BACKGROUND NET AREA INTENSITY UNCERT FWHM
CHANNEL ENERGY COUNTS COUNTS * AREA CTS/SEC 2 SIGMA % keV
-----
CE-144 267.94 134.06 273. 35. .003 166.99 .853s
CE-141 293.83 147.00 203. 15. .001 307.50 .939s
I-131 568.43 284.30 181. 3. .000 1141.40 1.606D
BA-140 608.38 304.27 142. 25. .002 194.81 .671s
LA-140 658.39 329.28 89. 35. .003 100.41 1.034s
I-131 727.00 363.58 48. 1. .000 1969.77 .000s
BE-7 953.23 476.69 62. 18. .002 163.23 1.816
LA-140 974.46 487.31 58. 48. .004 77.07 1.733
RU-103 997.87 499.01 47. 24. .002 110.24 .950s
BA-140 1073.33 536.74 44. 26. .002 109.33 .889s
CS-134 1205.68 602.92 43. 19. .002 153.94 .476s
RU-103 1220.50 610.33 51. 0. .000 .00 2.261D
RU-106 1243.88 622.02 11. 4. .000 226.27 .629s
I-131 1274.00 637.00 17. 1. .000 809.32 .000s
CS-137 1318.59 659.38 57. 27. .002 136.59 .603s
ZR-95 1443.59 721.88 25. 12. .001 162.73 .813s
ZR-95 1512.00 756.09 4. 0. .000 400.00 .167s
NB-95 1531.00 765.99 6. 0. .000 489.90 .000s
CS-134 1591.86 796.02 18. 15. .001 123.40 .903s
CO-58 1621.18 810.68 24. 19. .002 112.88 1.500
MN-54 1666.91 833.55 15. 6. .001 212.88 .471s
FE-59 2200.37 1100.31 13. 20. .002 96.89 1.411s
ZN-65 2229.87 1115.06 3. 2. .000 296.65 .449s
CO-60 2345.57 1172.92 7. 2. .000 400.00 .656s
FE-59 2584.00 1292.16 4. 0. .000 400.00 .000s
CO-60 2665.69 1333.01 4. 6. .001 140.44 .556s
K-40 2920.17 1460.28 8. 52. .004 36.64 2.394
LA-140 3192.00 1596.23 1. 0. .000 200.00 .000s
```

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.5909E+01	3.2025E+01
K-40	<	6.0403E+01	6.0403E+01
MN-54	<	2.2534E+00	2.3450E+00
FE-59	<	4.7242E+00	6.2400E+00
CO-58	<	2.5272E+00	3.0127E+00
CO-60	<	1.4091E+00	1.4182E+00
ZN-65	<	2.3124E+00	2.4334E+00
ZR-95	<	1.8921E+00	2.2901E+00
NB-95	<	1.5123E+00	2.1566E+00
RU-103	<	2.6025E+00	3.5731E+00
RU-106	<	1.7591E+01	1.9195E+01
I-131	<	2.3510E+00	1.1092E+01
CS-134	<	2.7141E+00	2.7592E+00
CS-137	<	3.8901E+00	3.8946E+00
BA-140	<	1.0247E+01	2.7173E+01
LA-140	<	9.8390E-01	2.6092E+00
CE-141	<	5.1439E+00	7.5435E+00
CE-144	<	2.6761E+01	2.7955E+01

< MDA value printed.

A Activity printed, but activity < MDA.

SUMMARY

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	204.30 % I-131	304.04 % BA-140
320.76 % LA-140	364.40 & I-131	477.61 & BE-7	487.02 % LA-140
497.00 & RU-103	537.32 % BA-140	604.70 & CS-134	610.33 & RU-103
621.04 % RU-106	636.97 % I-131	661.66 & CS-137	724.10 & ZR-95
756.72 % ZR-95	765.79 % NB-95	795.04 % CS-134	810.77 % CO-58
834.04 & MN-54	1099.25 & FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.01 % K-40	1596.10 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description

TWW-7169 3.5 LITER
09-OCT-2007 12:00 AMS

Spectrum Filename: C:\User\37755.An1

Sum
11-1-07

Acquisition information

Start time 29-Oct-2007 09:54:02
Live time 8835
Real time 8863
Dead time .31%
Detector/Geometry IDs 3 & 0

Detector system

MCP 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB
Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	09-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Geometry correction
Random summing

NU
NO

EG&G DRTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 12:21:41 Page 2
Environmental Inc Spectrum name: 37755.An1

Energy calibration normalized difference: .0074

```
***** UNIDENTIFIED PEAK SUMMARY *****
PEAK CENTROID BACKGROUND NET AREA EFFICIENCY UNCERT FWHM SUSPECTED
CHANNEL ENERGY COUNTS COUNTS * AREA 2 SIGMA % keV NUCLIDE
-----
185.45 92.63 210. 182. 1.195E+04 52.49 1.484 PB-214 s
703.78 351.85 95. 82. 6.362E+03 50.86 1.346 PB-214
1217.47 608.73 35. 67. 7.875E+03 34.88 1.362 XE-135 D
```

s Peak fails shape tests.
D Peak area deconvoluted.

```
***** IDENTIFIED PEAK SUMMARY *****
NUCLIDE PEAK CENTROID BACKGROUND NET AREA INTENSITY UNCERT FWHM
CHANNEL ENERGY COUNTS COUNTS CTS/SEC 2 SIGMA % keV
-----
CE-144 266.00 132.92 159. 11. .001 329.79 .103s
CE-141 291.27 145.55 105. 22. .002 212.62 1.100
I-131 567.04 283.46 68. 16. .002 295.80 1.540s
BA-140 609.67 304.78 41. 0. .000 .00 .417s
LA-140 657.29 328.60 36. 24. .003 129.10 1.777s
I-131 728.54 364.22 59. 21. .002 136.59 .514s
BE-7 953.38 476.66 37. 18. .002 129.33 2.182s
LA-140 973.55 486.75 30. 10. .001 200.00 1.222
RU-103 993.36 496.66 22. 5. .001 311.19 .912
BA-140 1072.55 536.26 35. 13. .001 100.30 1.438
CS-134 1209.42 604.70 18. 1. .000 820.68 1.360D
RU-103 1220.68 610.33 78. 8. .001 314.67 1.363D
RU-106 1243.73 621.86 19. 5. .001 262.20 .729s
I-131 1275.04 637.51 10. 3. .000 269.43 .464s
CS-137 1322.71 661.36 19. 9. .001 164.75 1.501
ZR-95 1448.85 724.43 7. 6. .001 157.53 1.627
ZR-95 1512.70 756.36 6. 2. .000 318.28 .504s
NB-95 1533.24 766.63 23. 30. .003 79.35 1.377s
CS-134 1591.58 795.81 5. 1. .000 412.31 .519s
CO-58 1622.00 811.02 6. 1. .000 600.00 .000s
MN-54 1671.17 835.60 7. 1. .000 646.36 .397s
FE-59 2196.73 1098.41 5. 6. .001 158.51 .793s
ZN-65 2228.89 1114.49 4. 4. .000 195.18 .459s
CO-60 2345.00 1172.55 1. 0. .000 200.00 .167s
FE-59 2584.26 1292.19 2. 14. .002 72.52 .865s
CO-60 2663.42 1331.78 4. 7. .001 124.32 1.056s
K-40 2921.50 1460.82 5. 25. .003 51.64 .990s
LA-140 3191.14 1595.65 2. 11. .001 73.77 .688s
```

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.6636E+01	3.4511E+01
K-40	<	5.6543E+01	5.6543E+01
MN-54	<	1.8768E+00	1.9617E+00
FE-59	<	2.9386E+00	4.0069E+00
CO-58	<	1.5886E+00	1.9304E+00
CO-60	<	2.4512E+00	2.4688E+00
ZN-65	<	2.7627E+00	2.9235E+00
ZR-95	<	3.5168E+00	4.3630E+00
NB-95	<	2.7719E+00	4.1091E+00
RU-103	<	2.2524E+00	3.2013E+00
RU-106	<	2.6484E+01	2.7495E+01
I-131	<	3.1003E+00	1.7372E+01
CS-134	<	2.0360E+00	2.0736E+00
CS-137	<	2.8770E+00	2.8006E+00
BA-140	<	1.0575E+01	3.1193E+01
LA-140	<	1.3522E+00	3.9886E+00
CE-141	<	4.4177E+00	6.7552E+00
CE-144	<	2.4529E+01	2.5746E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 % CE-141	204.30 & I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 & BE-7	487.02 % LA-140
497.00 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.10 % ZR-95
756.72 % ZR-95	765.79 & NB-95	795.84 % CS-134	810.77 % CO-58
834.84 & MN-54	1099.25 & FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.10 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sign
11-1-07

Sample description
TWW-7170 3.5 LITER
05-OCT-2007 12:00 AMS

Spectrum Filename: C:\User\17740.Anl

Acquisition information

Start time 20-Oct-2007 10:35:20
Live time 30000
Real time 30034
Dead time .11%
Detector/Geometry IDs 1 & 0

Detector system

MCP 1 Input 1

Calibration

Filename: d1g1.Clb
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:50
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4040 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RIS0 method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	05-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

Geometry correction NO
 Random summing NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 08:23:07 Page 2
 Environmental Inc Spectrum name: 17740.Aml

Energy calibration normalized difference: .1910

***** UNIDENTIFIED PEAK SUMMARY *****								
PEAK CENTROID	BACKGROUND	NET AREA	EFFICIENCY	UNCERT	FWHM	SUSPECTED		
CHANNEL	ENERGY	COUNTS	* AREA	2 SIGMA %	keV	NUCLIDE		
188.06	92.23	1352.	337.	2.834E+04	46.71	1.972	PB-214	s
706.15	351.77	506.	185.	1.482E+04	54.66	1.481	PB-214	
1023.60	510.00	466.	580.	5.970E+04	21.30	2.676	TL-200	s
1220.34	609.37	165.	214.	2.489E+04	21.79	1.047	BI-214	D
2240.59	1120.50	41.	85.	1.517E+04	30.49	2.091	SC-46	D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****								
NUCLIDE	PEAK CENTROID	BACKGROUND	NET AREA	INTENSITY	UNCERT	FWHM		
	CHANNEL	ENERGY	COUNTS	CTS/SEC	2 SIGMA %	keV		
CE-144	270.53	133.54	764.	22.	.001	362.90	1.640D	
CE-141	294.28	145.44	1215.	39.	.001	252.88	1.645D	
I-131	570.87	204.00	410.	72.	.002	100.85	.516s	
BA-140	609.36	303.20	420.	72.	.002	101.38	1.079s	
LA-140	661.05	329.18	209.	29.	.001	197.36	.666s	
I-131	729.39	363.41	222.	24.	.001	191.27	.871s	
BE-7	958.18	478.03	207.	29.	.001	182.73	.695s	
LA-140	974.36	406.14	156.	22.	.001	190.26	1.103s	
RU-103	994.00	495.97	72.	9.	.000	227.71	.184s	
BA-140	1078.74	538.43	233.	38.	.001	178.22	.860s	
CS-134	1211.03	604.70	181.	18.	.001	218.66	1.845D	
RU-103	1222.27	610.33	152.	0.	.000	.00	1.956D	
RU-106	1243.50	620.97	60.	6.	.000	343.19	.490s	
I-131	1276.46	637.40	121.	36.	.001	121.67	.550s	
CS-137	1326.63	662.62	173.	36.	.001	159.74	2.209	
ZR-95	1444.00	721.41	92.	20.	.001	177.56	.200s	
ZR-95	1510.02	754.49	92.	31.	.001	117.16	2.451s	
NB-95	1536.63	767.82	124.	77.	.003	66.16	2.600s	
CS-134	1591.15	795.13	56.	16.	.001	151.38	1.191s	
CO-58	1622.29	810.73	90.	16.	.001	229.97	.737s	
MN-54	1671.41	835.34	48.	13.	.000	160.62	.965s	
FE-59	2194.71	1097.52	36.	11.	.000	188.07	.471s	
ZN-65	2230.70	1115.55	74.	13.	.000	192.86	2.088D	
CO-60	2347.00	1173.81	14.	0.	.000	864.10	.000s	
FE-59	2580.22	1290.66	36.	9.	.000	240.37	.626s	
CO-60	2664.81	1333.04	37.	46.	.002	64.94	2.849s	
K-40	2920.70	1461.24	43.	232.	.008	18.20	2.197	
LA-140	3187.73	1595.03	16.	7.	.000	178.43	1.417s	

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	1.7142E+01	2.3203E+01	
K-40	<	4.2965E+01	4.2965E+01	
MN-54	<	1.3371E+00	1.4000E+00	
FE-59	<	2.6741E+00	3.8423E+00	
CO-58	<	1.6484E+00	2.0701E+00	
CO-60	<	1.7550E+00	1.7697E+00	
ZN-65	<	3.6174E+00	3.8640E+00	
ZR-95	<	3.1503E+00	4.0532E+00	
NB-95	<	2.0033E+00	3.1739E+00	
RU-103	<	1.1589E+00	1.7479E+00	
RU-106	<	1.3354E+01	1.3952E+01	
I-131	<	1.9171E+00	1.4326E+01	
CS-134	<	1.9089E+00	1.9502E+00	
CS-137	<	2.3988E+00	2.4023E+00	
BA-140	<	8.3666E+00	2.9623E+01	
LA-140	<	1.8810E+00	6.6599E+00	
CE-141	<	4.8207E+00	7.9193E+00	
CE-144	<	1.7204E+01	1.8206E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.00 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-7171 3.5 LITER
05-OCT-2007 12:00 AMS

Spectrum Filename: C:\User\17741.An1

Sum
11-1-07

Acquisition information
Start time 29-Oct-2007 00:56:30
Live time 15425
Real time 15462
Dead time .24%
Detector/Geometry IDs 1 & 0

Detector system
MCE 1 Input 1

Calibration
Filename: d1g1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	05-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 13:14:07 Page 2
Environmental Inc Spectrum name: 17741.Ani

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****							
PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
707.09	352.24	259.	131.	1.052E+04	55.88	1.561	PB-214 s
1023.76	510.88	180.	312.	3.215E+04	23.92	1.978	TL-208 s

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****							
NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	270.53	133.54	609.	22.	.001	316.09	1.640D
CE-141	294.00	145.30	153.	3.	.000	995.99	.000s
I-131	570.00	283.56	238.	48.	.003	121.76	1.178s
BA-140	613.30	305.26	141.	0.	.001	425.73	.575s
LA-140	658.48	327.89	282.	64.	.004	111.44	1.822
I-131	731.67	364.55	51.	5.	.000	299.33	.814s
BE-7	958.79	478.33	118.	36.	.002	125.22	.872s
LA-140	976.00	486.96	79.	8.	.001	354.45	.000s
RU-103	995.43	496.69	57.	2.	.000	843.22	.648s
BA-140	1075.51	536.81	88.	27.	.002	138.51	1.579
CS-134	1211.03	604.70	87.	13.	.001	215.27	1.045D
RU-103	1222.27	610.33	100.	101.	.007	34.44	1.840D
RU-106	1243.86	621.15	62.	15.	.001	194.58	.691s
I-131	1273.87	636.18	22.	1.	.000	1101.51	1.036s
CS-137	1326.95	662.77	50.	17.	.001	170.56	1.154s
ZR-95	1451.32	725.08	53.	16.	.001	177.55	.622s
ZR-95	1511.27	755.11	50.	19.	.001	160.00	.534s
NB-95	1538.06	768.54	54.	23.	.001	140.57	.994s
CS-134	1593.00	796.06	23.	3.	.000	505.96	.391s
CO-58	1618.48	808.83	39.	18.	.001	143.96	.592s
MN-54	1669.78	834.53	12.	1.	.000	824.62	.468s
FE-59	2196.17	1098.24	11.	0.	.000	763.03	.423s
ZN-65	2232.33	1116.36	14.	6.	.000	194.37	.624s
CO-60	2348.28	1174.45	22.	25.	.002	85.04	1.292s
FE-59	2580.66	1290.88	17.	34.	.002	70.25	.609s
CO-60	2667.15	1334.21	14.	11.	.001	148.82	.917s
K-40	2928.56	1461.17	13.	158.	.010	19.92	2.033s
LA-140	3188.00	1595.17	8.	1.	.000	721.11	.000s

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED ACTIVITY	UNCERTAINTY	2 SIGMA COUNTING
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	2.5087E+01	3.4223E+01	
K-40	<	5.8301E+01	5.8301E+01	
MN-54	<	1.4262E+00	1.5038E+00	
FE-59	<	3.1199E+00	4.5248E+00	
CO-58	<	2.1060E+00	2.6603E+00	
CO-60	<	2.1977E+00	2.2167E+00	
ZN-65	<	3.0633E+00	3.2783E+00	
ZR-95	<	4.4919E+00	5.8168E+00	
NB-95	<	2.6179E+00	4.1968E+00	
RU-103	<	1.9817E+00	3.0205E+00	
RU-106	<	2.4233E+01	2.5347E+01	
I-131	<	1.8705E+00	1.4720E+01	
CS-134	<	2.5770E+00	2.6342E+00	
CS-137	<	2.5959E+00	2.5998E+00	
BA-140	<	1.0073E+01	3.6842E+01	
LA-140	<	2.5658E+00	9.3847E+00	
CE-141	<	3.4455E+00	5.7328E+00	
CE-144	<	2.9769E+01	3.1549E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TW-7172 3.5 LITER
05-OCT-2007 12:00 AMS

Inc
11-1-07

Spectrum Filename: C:\User\37754.An1

Acquisition information

Start time 28-Oct-2007 10:38:47
Live time 30000
Real time 30034
Dead time .11%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:
RISO method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	05-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 08:23:59 Page 2
Environmental Inc Spectrum name: 37754.Anl

Energy calibration normalized difference: .1132

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY % AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
126.25	63.03	592.	225.	2.579E+04	33.31	1.016	PA-234 D
132.71	66.26	610.	152.	1.592E+04	48.72	1.018	TA-182 D
185.10	92.46	724.	408.	2.684E+04	38.60	1.424	PB-214 s
371.63	185.74	576.	263.	1.336E+04	53.07	1.255	U-235 s
476.63	238.25	312.	214.	1.254E+04	42.68	1.163	PB-212
703.02	351.46	325.	278.	2.160E+04	27.61	1.203	PB-214
1021.14	510.55	348.	581.	5.975E+04	16.59	2.699	J-133 s
1218.04	609.01	145.	245.	2.074E+04	18.90	1.362	BI-214 D
1821.72	910.89	72.	97.	1.529E+04	41.78	1.948	AC-228 s
1937.38	968.72	63.	56.	9.228E+03	48.45	1.569	AC-228 D
3528.72	1764.44	25.	55.	1.423E+04	48.79	1.423	BI-214

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	270.00	134.92	548.	37.	.001	181.95	.000s
CE-141	293.10	146.51	504.	34.	.001	325.29	.519s
I-131	568.71	284.30	255.	23.	.001	199.44	1.161D
BA-140	608.07	303.98	330.	73.	.002	166.72	2.070s
LA-140	659.89	329.90	207.	35.	.001	223.02	1.723s
I-131	728.25	364.08	135.	20.	.001	288.10	1.674s
BE-7	952.06	476.00	144.	16.	.001	250.00	1.990s
LA-140	975.19	487.57	113.	45.	.001	146.12	1.190s
RU-103	995.27	497.61	150.	68.	.002	116.46	1.444s
BA-140	1075.61	537.79	86.	43.	.001	134.10	1.795s
CS-134	1209.42	604.70	78.	33.	.001	83.51	1.360D
RU-103	1220.68	610.33	362.	13.	.000	405.32	1.363D
RU-106	1244.38	622.18	42.	14.	.000	192.72	.844s
I-131	1275.24	637.62	42.	30.	.001	120.00	.628s
CS-137	1323.00	661.50	37.	0.	.000	1403.17	.000s
ZR-95	1448.78	724.40	50.	12.	.000	176.38	.956
ZR-95	1512.13	756.07	37.	3.	.000	481.66	.379s
NE-95	1530.11	765.07	67.	10.	.000	265.46	.544s
CS-134	1592.00	796.02	22.	0.	.000	938.08	.000s
CO-59	1624.17	812.10	28.	4.	.000	387.30	1.364
MN-54	1667.32	833.68	51.	9.	.000	261.54	.602s
FE-59	2200.35	1100.22	35.	16.	.001	143.98	1.904
ZN-65	2232.00	1116.05	14.	0.	.000	748.33	.000s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2348.75	1174.43	23.	18.	.001	105.37	.666s
FE-59	2581.43	1298.78	37.	24.	.001	118.88	1.313
CO-60	2659.79	1329.96	24.	13.	.000	152.32	.400s
K-40	2921.06	1468.60	28.	286.	.010	14.13	2.136
LA-140	3184.50	1592.33	22.	19.	.001	118.88	.972s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

	pCi/LITER	pCi/LITER	pCi/LITER
BE-7 <	1.5299E+01	2.0710E+01	
K-40	8.4129E+01	8.4129E+01	2.192E+01
MN-54 <	1.3685E+00	1.4411E+00	
FE-59 <	2.3456E+00	3.3705E+00	
CO-58 <	9.8825E-01	1.2411E+00	
CO-60 <	1.5780E+00	1.5912E+00	
ZN-65 <	1.6272E+00	1.7385E+00	
ZR-95 <	2.2687E+00	2.9190E+00	
NB-95 <	1.3829E+00	2.1910E+00	
RU-103 <	1.6763E+00	2.5283E+00	
RU-106 <	1.2696E+01	1.3265E+01	
I-131 <	1.4123E+00	1.0556E+01	
CS-134 <	1.2654E+00	1.2920E+00	
CS-137 <	1.2701E+00	1.2720E+00	
BA-140 <	4.9359E+00	1.7479E+01	
LA-140 <	1.4433E+00	5.1111E+00	
CE-141 <	2.8357E+00	4.6586E+00	
CE-144 <	1.3402E+01	1.4183E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

----- S U M M A R Y -----
 TOTAL ACTIVITY (59.9 to 2024.1 keV) 8.4128730E+01 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 8.4128730E+01 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 & CE-141	284.30 & I-131	304.84 & BA-140
328.76 & LA-140	364.40 & I-131	477.61 & BE-7	487.02 & LA-140
497.08 & RU-103	537.32 & BA-140	604.70 & CS-134	618.33 & RU-103
621.84 & RU-106	636.97 & I-131	661.66 & CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 & NB-95	795.84 & CS-134	818.77 & CO-58
834.84 & MN-54	1099.25 & FE-59	1115.55 & ZN-65	1173.24 & CO-60
1291.60 & FE-59	1332.50 & CO-60	1596.18 & LA-140	

Sample description

TWW-7173 3.5 LITER
05-OCT-2007 12:00 BG

Spectrum Filename: C:\User\37753.An1

SAC
11-1-07

Acquisition information

Start time 27-Oct-2007 12:56:13
Live time 30000
Real time 30036
Dead time .12%
Detector/Geometry IDs 3 & 0

Detector system

MCE 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.0571E+05

Detection limit method:

RISØ method

Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	05-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Geometry correction NO
 Random summing NO

Energy calibration normalized difference: .0334

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
105.16	92.49	539.	428. 2.014E+04	30.29	1.353	FR-214 s
396.56	198.21	366.	165. 8.590E+03	58.90	1.395	TA-182 s
476.44	238.15	450.	284. 1.663E+04	48.71	1.271	FR-212 s
1021.70	510.83	275.	583. 6.003E+04	15.18	3.189	TL-208 s
1165.62	582.80	128.	81. 9.165E+03	58.21	1.604	TL-208 s
1191.28	595.63	98.	80. 9.199E+03	58.67	1.252	J-134 s
1218.44	609.21	93.	189. 2.217E+04	20.52	1.362	BI-214 D
1694.02	847.03	68.	77. 1.161E+04	51.28	1.012	J-134 s
1923.22	911.64	63.	68. 1.001E+04	54.14	1.504	AC-228
2241.19	1120.64	41.	42. 7.845E+03	52.38	1.651	SC-46 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	268.61	134.22	234.	18.	.001	298.14 .607s
CE-141	289.56	144.70	702.	100.	.004	148.45 .824s
I-131	571.00	285.44	209.	13.	.000	319.39 .497s
BA-140	610.53	305.21	302.	53.	.002	200.35 1.197s
LA-140	659.37	329.64	260.	43.	.001	214.31 1.834s
I-131	727.90	363.90	118.	15.	.000	338.42 .578s
BE-7	954.37	477.16	90.	19.	.001	248.88 .648s
LA-140	974.77	487.36	68.	20.	.001	193.79 .835
RU-103	993.00	496.48	48.	0.	.000	1385.64 .250s
BA-140	1073.20	536.58	48.	20.	.001	175.50 .741s
CS-134	1209.42	604.70	96.	9.	.000	299.25 1.360D
RU-103	1220.60	610.33	191.	0.	.000	.00 .207D
RU-106	1245.00	622.49	30.	0.	.000	1095.45 .000s
I-131	1271.15	635.57	50.	44.	.001	101.67 .738s
CS-137	1321.78	660.89	67.	22.	.001	205.28 1.180
ZR-95	1450.19	725.10	49.	9.	.000	229.87 .999
ZR-95	1515.24	757.63	34.	3.	.000	545.76 .489s
NE-95	1528.17	764.10	69.	6.	.000	487.21 .566s
CS-134	1590.38	795.21	37.	4.	.000	373.37 .543s
CO-58	1621.32	810.68	54.	35.	.001	90.53 1.409s
MN-54	1670.00	835.02	23.	5.	.000	256.35 .000s
FE-59	2197.00	1098.55	18.	2.	.000	681.18 .000s
ZN-65	2230.99	1115.55	41.	11.	.000	169.06 1.648D
CO-60	2344.95	1172.53	30.	10.	.000	200.00 .641s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	2587.00	1293.56	25.	6.	.000	299.38	1.036s
CO-60	2665.25	1332.69	16.	8.	.000	177.95	.625s
K-40	2921.35	1460.75	37.	121.	.004	27.66	1.661
LA-140	3191.00	1595.58	6.	0.	.000	489.90	.250s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

BE-7	<	1.2023E+01	1.7001E+01	
K-40	<	3.2601E+01	3.2601E+01	
MN-54	<	9.9307E-01	1.0437E+00	
FE-59	<	1.7324E+00	2.4417E+00	
CO-50	<	1.3314E+00	1.6519E+00	
CO-60	<	1.4121E+00	1.4234E+00	
ZN-65	<	2.7715E+00	2.9506E+00	
ZR-95	<	2.2190E+00	2.0170E+00	
NE-95	<	1.4095E+00	2.1792E+00	
RU-103	<	1.0069E+00	1.4059E+00	
RU-106	<	1.1651E+01	1.2145E+01	
I-131	<	1.3205E+00	0.0692E+00	
CS-134	<	1.3998E+00	1.4205E+00	
CS-137	<	1.5917E+00	1.5940E+00	
BA-140	<	3.7205E+00	1.2310E+01	
LA-140	<	7.9542E-01	2.6335E+00	
CE-141	<	3.3262E+00	5.3221E+00	
CE-144	<	9.2161E+00	9.7236E+00	

< MDA value printed.
 A Activity printed, but activity < MDA.

SUMMARY
 TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 & CE-141	204.30 & I-131	304.84 & BA-140
320.76 & LA-140	364.48 & I-131	477.61 & BE-7	487.02 & LA-140
497.00 & RU-103	537.32 & BA-140	604.70 & CS-134	610.33 & RU-103
621.84 & RU-106	636.97 & I-131	661.66 & CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 & NE-95	795.84 & CS-134	810.77 & CO-50
834.84 & MN-54	1099.25 & FE-59	1115.55 & ZN-65	1173.24 & CO-60
1291.60 & FE-59	1332.50 & CO-60	1460.81 & K-40	1596.10 & LA-140

Sample description
TWW-7174 3.5 LITER
05-OCT-2007 12:00 AMS

Spectrum Filename: C:\User\87712.Ani

Acquisition information

Start time 28-Oct-2007 18:47:17
Live time 30000
Real time 30000
Dead time .03%
Detector/Geometry IDs 0 & 0

Detector system
MCB 5 Input 4

Calibration

Filename: D0q1.Clb
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	05-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg@w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 11:00:29 Page 2
Environmental Inc Spectrum name: 87712.Am1

Energy calibration normalized difference: .1217

***** UNIDENTIFIED PEAK SUMMARY *****									
PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE			
184.90	92.55	900.	263. 1.997E+04	49.18	1.326	TH-234	s		
702.73	351.45	329.	254. 2.100E+04	32.32	1.534	PB-214	s		
1021.23	510.69	354.	534. 6.000E+04	20.56	2.410	TL-208	s		
1217.58	608.87	134.	217. 2.831E+04	20.29	1.793	BI-214	D		

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****									
NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV			
CE-144	266.90	133.54	525.	0.	.000	1.525			
CE-141	290.70	145.44	576.	0.	.000	1.532			
I-131	570.00	205.00	100.	7.	.000	.000s	549.56		
BA-140	600.39	304.20	195.	17.	.001	.531s	237.34		
LA-140	657.97	329.07	259.	13.	.000	.390s	397.74		
I-131	724.30	362.27	200.	33.	.001	.830s	205.79		
BE-7	955.00	477.50	49.	0.	.000	.000s	1400.00		
LA-140	976.00	488.40	104.	40.	.001	1.107s	151.25		
RU-103	994.00	497.00	37.	0.	.000	.000s	1216.55		
BA-140	1071.56	535.06	156.	29.	.001	1.360	176.23		
CS-134	1209.24	604.70	130.	24.	.001	1.790D	146.30		
RU-103	1220.50	610.33	144.	0.	.000	2.122D	.00		
RU-106	1242.00	621.00	31.	5.	.000	.450s	292.07		
I-131	1275.00	637.50	95.	16.	.001	.000s	264.34		
CS-137	1327.37	663.77	05.	27.	.001	1.204	130.49		
ZR-95	1448.54	724.35	69.	9.	.000	.425s	326.60		
ZR-95	1512.17	756.17	84.	20.	.001	.690s	104.43		
NB-95	1533.05	767.01	95.	46.	.002	1.455s	93.01		
CS-134	1592.00	796.00	30.	1.	.000	.000s	1754.99		
CO-58	1618.37	809.27	39.	11.	.000	1.504	190.79		
MN-54	1670.00	835.00	19.	0.	.000	.000s	071.70		
FE-59	2190.72	1099.40	53.	36.	.001	1.241s	100.33		
ZN-65	2231.77	1116.01	23.	14.	.000	1.100s	120.77		
CO-60	2347.59	1173.93	21.	6.	.000	.549s	279.15		
FE-59	2507.37	1293.84	56.	30.	.001	.667s	109.14		
CO-60	2660.97	1330.65	22.	26.	.001	.600s	03.20		
K-40	2920.66	1460.52	26.	177.	.006	2.164	21.56		
LA-140	3107.17	1593.01	17.	9.	.000	.947s	172.61		

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED ACTIVITY	UNCERTAINTY	2 SIGMA COUNTING
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	9.2428E+00	1.2512E+01	
K-40	<	3.8197E+01	3.8197E+01	
MN-54	<	1.1000E+00	1.1584E+00	
FE-59	<	3.4090E+00	5.0130E+00	
CO-58	<	1.2494E+00	1.5692E+00	
CO-60	<	1.3220E+00	1.3331E+00	
ZN-65	<	2.3613E+00	2.5228E+00	
ZR-95	<	3.0973E+00	3.9853E+00	
NR-95	<	1.9109E+00	3.0280E+00	
RU-103	<	8.9441E-01	1.3491E+00	
RU-106	<	1.1313E+01	1.1020E+01	
I-131	<	2.2118E+00	1.6541E+01	
CS-134	<	1.8715E+00	1.9119E+00	
CS-137	<	1.8652E+00	1.8690E+00	
BA-140	<	7.4497E+00	2.6389E+01	
LA-140	<	1.4333E+00	5.0771E+00	
CE-141	<	3.3581E+00	5.5177E+00	
CE-144	<	1.4351E+01	1.5187E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

294.30 % I-131	304.84 % BA-140	328.76 % LA-140	364.48 & I-131
477.61 % BE-7	487.02 & LA-140	497.08 % RU-103	537.32 & BA-140
604.70 % CS-134	610.33 & RU-103	621.84 % RU-106	636.97 % I-131
661.66 & CS-137	724.18 % ZR-95	756.72 % ZR-95	765.79 & NR-95
795.84 % CS-134	810.77 & CO-58	834.84 % MN-54	1099.25 % FE-59
1115.55 % ZN-65	1173.24 % CO-60	1291.60 & FE-59	1332.50 & CO-60
1460.81 % K-40	1596.18 & LA-140		

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-7175 3.5 LITER
10-OCT-2007 12:00 AMS

Spectrum Filename: C:\User\87713.Anl

Sw
11-1-07

Acquisition information

Start time 29-Oct-2007 11:57:18
Live time 8840
Real time 8845
Dead time .06%
Detector/Geometry IDs B & 0

Detector system
MCP 5 Input 4

Calibration

Filename: D0g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	10-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkgbw.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 14W02.96 29-OCT-2007 14:24:42 Page 2
Environmental Inc Spectrum name: 87713.Anl

Energy calibration normalized difference: .1171

***** UNIDENTIFIED PEAK SUMMARY *****								
PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE		
185.13	92.66	191.	90. 6.786E+03	57.45	1.757	PB-214		
476.98	238.57	96.	57. 3.704E+03	58.43	1.458	PB-212 sM		
1020.84	510.50	57.	236. 2.696E+04	20.97	2.819	J-133 s		
1217.69	608.93	36.	59. 7.735E+03	38.56	1.793	BI-214 D		

s Peak fails shape tests.
D Peak area deconvoluted.
M Peak is close to a library peak.

***** IDENTIFIED PEAK SUMMARY *****								
NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV		
CE-144	269.00	134.59	93.	5.	.001	425.73	.000s	
CE-141	290.70	145.44	132.	2.	.000	1590.14	1.532D	
I-131	570.31	285.24	95.	21.	.002	175.01	.568s	
BA-140	610.16	305.16	132.	35.	.004	141.52	.712s	
LA-140	656.61	328.39	67.	21.	.002	132.29	1.580	
I-131	727.12	363.64	26.	3.	.000	409.15	.288s	
BE-7	954.00	477.08	12.	4.	.000	200.00	.179s	
LA-140	972.00	486.08	17.	4.	.000	308.22	.450s	
RU-103	994.00	497.08	12.	0.	.000	692.82	.800s	
BA-140	1074.00	537.12	31.	6.	.001	296.42	.824s	
CS-134	1209.24	604.70	20.	5.	.001	273.35	1.790D	
RU-103	1220.50	610.33	45.	0.	.000	.00	1.707D	
RU-106	1248.92	624.54	30.	14.	.002	165.37	.514s	
I-131	1275.33	637.75	11.	8.	.001	136.93	1.332	
CS-137	1318.52	659.34	19.	15.	.002	132.02	.721s	
ZR-95	1451.52	725.84	18.	13.	.001	141.13	.489s	
ZR-95	1514.21	757.28	11.	17.	.002	89.88	1.500	
NB-95	1529.00	764.59	5.	4.	.000	187.88	.547s	
CS-134	1588.06	794.12	16.	15.	.002	130.00	.461s	
CO-58	1620.67	810.43	6.	1.	.000	600.00	.362s	
MN-54	1668.00	834.09	3.	0.	.000	346.41	.250s	
FE-59	2197.40	1098.82	3.	2.	.000	322.49	.500s	
ZN-65	2228.94	1114.60	5.	6.	.001	157.40	2.494	
CO-60	2345.33	1172.80	4.	1.	.000	400.00	.420s	
FE-59	2581.00	1290.66	2.	1.	.000	382.97	.150s	
CO-60	2663.33	1331.83	3.	1.	.000	346.41	.500s	
K-40	2921.79	1461.09	4.	47.	.005	37.82	1.333s	
LA-140	3187.00	1593.72	3.	6.	.001	144.57	.417s	

s Peak fails shape tests.
D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA

NUCLIDE ACTIVITY ACTIVITY ACTIVITY
 pCi/LITER pCi/LITER pCi/LITER

BE-7	<	1.5668E+01	2.0060E+01
K-40	<	6.7947E+01	6.7947E+01
MN-54	<	1.7104E+00	1.7841E+00
FE-59	<	3.7805E+00	5.0821E+00
CO-58	<	1.7169E+00	2.0678E+00
CO-60	<	1.5240E+00	1.5344E+00
ZN-65	<	3.8310E+00	4.0436E+00
ZR-95	<	3.8533E+00	4.7333E+00
NB-95	<	1.7705E+00	2.5092E+00
RU-103	<	1.7286E+00	2.4174E+00
RU-106	<	3.2575E+01	3.3761E+01
I-131	<	2.2632E+00	1.1688E+01
CS-134	<	2.4203E+00	2.4630E+00
CS-137	<	2.9999E+00	3.0035E+00
BA-140	<	1.1186E+01	3.1395E+01
LA-140	<	2.1721E+00	6.0964E+00
CE-141	<	5.4404E+00	9.1504E+00
CE-144	<	2.0537E+01	2.1500E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 & CE-144	145.44 x CE-141	204.30 & I-131	304.04 x BA-140
320.76 x LA-140	364.40 & I-131	477.61 x BE-7	487.02 & LA-140
497.00 x RU-103	537.32 x BA-140	604.70 x CS-134	610.33 & RU-103
621.04 & RU-106	636.97 x I-131	661.66 & CS-137	724.18 & ZR-95
756.72 x ZR-95	765.79 & NB-95	795.04 & CS-134	810.77 x CO-58
834.84 x MN-54	1099.25 x FE-59	1115.55 x ZN-65	1173.24 x CO-60
1291.60 x FE-59	1332.50 x CO-60	1460.01 x K-40	1596.10 & LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

x - Peak fails sensitivity test.

- Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-7176 3.5 LITER
10-OCT-2007 12:00 AMS

*See
11-1-07*

Spectrum Filename: C:\User\37756.Anl

Acquisition information

Start time 29-Oct-2007.12:27:18
Live time 8199
Real time 8209
Dead time .13%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.Clb
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.0571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	10-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 14:44:05 Page 2
Environmental Inc Spectrum name: 37756.Anl

Energy calibration normalized difference: .2800

***** UNIDENTIFIED PEAK SUMMARY *****								
PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE		
105.55	92.60	137.	121. 7.906E+03	54.44	1.335	TH-234	s	
371.60	105.72	144.	90. 4.573E+03	40.38	1.003	U-235		
1210.14	609.06	20.	75. 0.751E+03	20.67	1.362	BI-214	D	

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****								
NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV		
CE-144	265.02	132.88	75.	30.	.005	106.96	1.443s	
CE-141	291.89	145.86	90.	23.	.003	200.74	.696	
I-131	570.93	285.41	63.	30.	.004	162.89	1.164s	
BA-140	609.67	304.78	33.	0.	.000	.00	.368s	
LA-140	660.00	329.95	41.	6.	.001	312.69	.000s	
I-131	720.41	364.16	50.	30.	.004	153.40	.849s	
BE-7	955.08	477.51	18.	4.	.000	316.23	.750s	
LA-140	972.53	486.24	33.	10.	.001	227.30	.662s	
RU-103	993.67	496.81	21.	2.	.000	663.32	.737s	
BA-140	1076.26	538.11	23.	5.	.001	329.50	.844s	
CS-134	1209.42	604.70	18.	3.	.000	496.47	1.360D	
RU-103	1220.68	610.33	90.	0.	.000	.00	1.363D	
RU-106	1244.91	622.45	18.	7.	.001	211.69	.966	
I-131	1274.67	637.33	6.	1.	.000	489.90	1.000	
CS-137	1323.91	661.96	16.	8.	.001	176.50	.574s	
ZR-95	1448.33	724.17	5.	1.	.000	447.21	.378s	
ZR-95	1512.67	756.34	6.	0.	.000	565.69	.362s	
NB-95	1532.23	766.13	19.	20.	.002	101.96	.917s	
CS-134	1590.73	795.38	8.	9.	.001	119.57	1.030	
CO-58	1622.00	811.02	3.	0.	.000	346.41	.250s	
MN-54	1669.43	834.74	11.	12.	.001	114.04	.813s	
FE-59	2197.16	1098.63	4.	4.	.000	195.18	1.254	
ZN-65	2231.00	1115.55	4.	3.	.000	221.11	.736s	
CO-60	2341.80	1170.99	0.	9.	.001	66.67	1.000s	
FE-59	2580.80	1298.46	2.	2.	.000	244.95	.615s	
CO-60	2664.91	1332.52	1.	5.	.001	113.74	.892s	
K-40	2920.45	1460.30	2.	29.	.004	42.88	.895s	
LA-140	3190.78	1595.47	3.	2.	.000	317.40	.529s	

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	ACTIVITY	ACTIVITY	UNCERTAINTY
	pCi/LITER	pCi/LITER	2 SIGMA
			COUNTING
BE-7	< 2.2086E+01	2.0285E+01	
K-40	< 5.6870E+01	5.6870E+01	
MN-54	< 2.3150E+00	2.4149E+00	
FE-59	< 2.8190E+00	3.7908E+00	
CO-58	< 1.2910E+00	1.5551E+00	
CO-60	< 2.1399E+00	2.1546E+00	
ZN-65	< 3.1825E+00	3.3593E+00	
ZR-95	< 3.7455E+00	4.6019E+00	
NB-95	< 2.6766E+00	3.8984E+00	
RU-103	< 2.3597E+00	3.3013E+00	
RU-106	< 2.7583E+01	2.8589E+01	
I-131	< 3.0984E+00	1.6030E+01	
CS-134	< 2.2521E+00	2.2918E+00	
CS-137	< 2.9173E+00	2.9288E+00	
BA-140	< 9.3467E+00	2.6263E+01	
LA-140	< 1.8216E+00	5.1186E+00	
CE-141	< 4.5872E+00	6.8819E+00	
CE-144	< 1.8852E+01	1.9745E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 % CE-141	284.30 & I-131	304.84 % BA-140
328.76 & LA-140	364.48 % I-131	477.61 % BE-7	487.02 & LA-140
497.08 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 ! RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 & CO-60
1291.60 & FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description

TWW-7177 3.5 LITER
10-OCT-2007 12:00 AMS

Surv
11-1-07

Spectrum Filename: C:\User\17742.Anl

Acquisition information

Start time 29-Oct-2007 13:16:37
Live time 9725
Real time 9737
Dead time .12%
Detector/Geometry IDs 1 & 0

Detector system

MCB 1 Input 1

Calibration

Filename: d1g1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	10-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkglw.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 15:58:50 Page 2
Environmental Inc Spectrum name: 17742.Anl

Energy calibration normalized difference: .2169

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***** UNIDENTIFIED PEAK SUMMARY *****
PEAK CENTROID BACKGROUND NET AREA EFFICIENCY UNCERT FWHM SUSPECTED
CHANNEL ENERGY COUNTS COUNTS * AREA 2 SIGMA % keV NUCLIDE
-----
1023.00 510.91 107. 208. 2.147E+04 26.76 2.256 TL-200 s
```

s Peak fails shape tests.
D Peak area deconvoluted.

```
***** IDENTIFIED PEAK SUMMARY *****
NUCLIDE PEAK CENTROID BACKGROUND NET AREA INTENSITY UNCERT FWHM
CHANNEL ENERGY COUNTS COUNTS CTS/SEC 2 SIGMA % keV
-----
CE-144 267.70 132.13 263. 22. .002 240.76 .516s
CE-141 294.20 145.44 259. 0. .000 .00 1.645
I-131 571.05 204.09 160. 29. .003 173.79 .595s
BA-140 613.00 305.11 36. 3. .000 493.15 .000s
LA-140 660.00 328.65 65. 1. .000 2091.25 .000s
I-131 732.00 364.72 31. 0. .000 1113.55 .000s
BE-7 955.22 476.54 55. 31. .003 94.45 1.054s
LA-140 976.65 487.20 34. 3. .000 545.76 .575s
RU-103 996.00 496.98 20. 0. .000 894.43 .000s
BA-140 1077.09 537.60 32. 10. .002 120.95 .805s
CS-134 1210.52 604.45 35. 12. .001 106.50 .730s
RU-103 1222.27 610.33 39. 0. .000 .00 2.965D
RU-106 1245.23 621.93 46. 13. .001 204.48 .462s
I-131 1274.50 636.50 10. 0. .000 632.46 .505s
CS-137 1328.33 663.47 37. 11. .001 213.07 .751s
ZR-95 1449.57 724.21 10. 2. .000 391.58 .658s
ZR-95 1516.00 757.49 19. 1. .000 1004.99 .397s
NB-95 1532.50 765.75 37. 17. .002 154.90 .753s
CS-134 1506.81 792.96 37. 17. .002 176.27 .643s
CO-58 1620.70 809.94 24. 10. .001 181.11 .863s
MN-54 1671.40 835.34 29. 16. .002 141.71 .878s
FE-59 2197.22 1098.77 13. 15. .002 112.61 .783s
ZN-65 2230.56 1115.47 3. 2. .000 266.67 .301s
CO-60 2342.96 1171.74 6. 17. .002 73.40 .645s
FE-59 2501.83 1291.46 9. 0. .001 164.37 .462s
CO-60 2660.00 1330.63 11. 5. .001 217.94 .139s
K-40 2920.82 1461.30 10. 86. .009 29.23 1.929
LA-140 3109.00 1595.67 1. 0. .000 200.00 .167s
```

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED ACTIVITY	UNCERTAINTY	2 SIGMA COUNTING
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	2.7526E+01	3.5268E+01	
K-40	<	7.7025E+01	7.7025E+01	
MN-54	<	3.0754E+00	3.2083E+00	
FE-59	<	4.8824E+00	6.5689E+00	
CO-58	<	2.6378E+00	3.1786E+00	
CO-60	<	2.9485E+00	2.9688E+00	
ZN-65	<	2.0531E+00	2.1673E+00	
ZR-95	<	4.6489E+00	5.7140E+00	
NB-95	<	3.3987E+00	4.9535E+00	
RU-103	<	1.8923E+00	2.6490E+00	
RU-106	<	3.2721E+01	3.3915E+01	
I-131	<	2.3141E+00	1.2000E+01	
CS-134	<	2.5696E+00	2.6150E+00	
CS-137	<	3.4991E+00	3.5033E+00	
BA-140	<	9.8423E+00	2.7707E+01	
LA-140	<	2.7085E+00	7.6249E+00	
CE-141	<	6.8891E+00	1.0343E+01	
CE-144	<	3.1096E+01	3.2571E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (50.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	284.30	% I-131	304.84	% BA-140	328.76	% LA-140
364.48 % I-131	477.61	& BE-7	487.02	% LA-140	497.08	% RU-103
537.32 % BA-140	604.70	% CS-134	610.33	& RU-103	621.04	% RU-106
636.97 % I-131	661.66	& CS-137	724.18	% ZR-95	756.72	% ZR-95
765.79 % NB-95	795.84	& CS-134	810.77	% CO-58	834.84	% MN-54
1099.25 % FE-59	1115.55	% ZN-65	1173.24	& CO-60	1291.60	% FE-59
1332.50 & CO-60	1460.81	% K-40	1596.18	% LA-140		

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

* - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

Sample description

TJW-7178 3.5 LITER
10-OCT-2007 12:00 AMS

Smc
11-1-07

Spectrum Filename: C:\User\47622.An1

Acquisition information

Start time 28-Oct-2007 18:41:42
Live time 30000
Real time 30034
Dead time .11%
Detector/Geometry IDs 4 & 4

Detector system

MCB 1 Input 4

Calibration

Filename: D4g1.C1b
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB

Zero offset -.130 keV; Gain .500 keV/channel
Quadratic -.197E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	10-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 29-OCT-2007 09:44:39 Page 2
Environmental Inc Spectrum name: 47622.Anl

Energy calibration normalized difference: 1.0000

```
***** UNIDENTIFIED PEAK SUMMARY *****
PEAK CENTROID BACKGROUND NET AREA EFFICIENCY UNCERT FWHM SUSPECTED
CHANNEL ENERGY COUNTS COUNTS * AREA 2 SIGMA % keV NUCLIDE
-----
 703.84 351.88 337. 144. 1.810E+04 51.73 1.648 PB-214 s
1020.92 510.46 345. 418. 7.390E+04 24.43 3.610 J-133 s
```

s Peak fails shape tests.
D Peak area deconvoluted.

```
***** IDENTIFIED PEAK SUMMARY *****
NUCLIDE PEAK CENTROID BACKGROUND NET AREA INTENSITY UNCERT FWHM
CHANNEL ENERGY COUNTS COUNTS CTS/SEC 2 SIGMA % keV
-----
CE-144 268.55 134.18 956. 132. .004 125.60 .930
CE-141 292.97 146.40 1200. 174. .006 126.82 1.119s
I-131 566.27 283.08 336. 77. .003 136.58 1.747s
BA-140 608.25 304.08 231. 44. .001 171.89 1.116
LA-140 658.18 329.05 174. 51. .002 129.77 1.052
I-131 729.47 364.78 225. 92. .003 105.20 .744s
BE-7 955.29 477.63 152. 10. .000 407.59 1.212
LA-140 974.92 487.45 165. 39. .001 124.46 .886s
RU-103 994.70 497.35 210. 50. .002 124.39 .475s
BA-140 1078.00 535.00 162. 37. .001 141.47 .000s
CS-134 1209.36 604.78 114. 22. .001 144.00 1.665D
RU-103 1228.62 610.33 166. 13. .000 290.79 1.669D
RU-106 1243.98 622.01 99. 13. .000 270.87 1.178
I-131 1271.45 635.75 103. 17. .001 228.84 .471s
CS-137 1321.87 660.96 50. 12. .000 162.73 .500s
ZR-95 1444.77 722.42 60. 13. .000 202.35 .636s
ZR-95 1516.24 758.17 71. 22. .001 141.99 .571s
NB-95 1538.33 765.21 25. 2. .000 679.87 .489s
CS-134 1595.67 797.88 57. 9. .000 298.14 1.025s
CO-58 1617.96 809.03 66. 23. .001 147.31 .584s
MN-54 1678.81 835.46 67. 20. .001 153.19 .653s
FE-59 2195.41 1097.80 35. 14. .000 168.17 .405s
ZN-65 2231.67 1115.93 20. 3. .000 437.16 .625s
CO-60 2346.94 1173.57 51. 28. .001 118.17 .605s
FE-59 2582.00 1291.11 24. 10. .000 172.05 .953s
CO-60 2665.29 1332.76 23. 9. .000 179.00 .700s
K-40 2928.58 1468.42 41. 184. .006 22.94 3.193s
LA-140 3191.67 1595.97 5. 1. .000 412.31 .875s
```

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	ACTIVITY	ACTIVITY	UNCERTAINTY	2 SIGMA
		pCi/LITER	pCi/LITER	COUNTING	
BE-7	<	2.5351E+01	3.2156E+01		
K-40	#	8.7981E+01	8.7981E+01	4.502E+01	
MN-54	<	2.7305E+00	2.8436E+00		
FE-59	<	4.4060E+00	5.8569E+00		
CO-58	<	2.9591E+00	3.5388E+00		
CO-60	<	2.4343E+00	2.4504E+00		
ZN-65	<	3.7147E+00	3.9120E+00		
ZR-95	<	5.2443E+00	6.3921E+00		
NB-95	<	1.5334E+00	2.2008E+00		
RU-103	<	3.3392E+00	4.6110E+00		
RU-106	<	2.8700E+01	2.9713E+01		
I-131	<	3.2578E+00	1.5810E+01		
CS-134	<	2.6963E+00	2.7420E+00		
CS-137	<	2.5405E+00	2.5515E+00		
BA-140	<	1.1026E+01	3.1920E+01		
LA-140	<	2.9061E+00	7.8441E+00		
CE-141	<	6.1295E+00	9.0517E+00		
CE-144	<	2.3685E+01	2.4761E+01		

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 8.7981290E+01 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 8.7981290E+01 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 & CE-141	284.30 & I-131	304.84 & BA-140
328.76 * LA-140	364.48 * I-131	477.61 * BE-7	487.02 * LA-140
497.08 * RU-103	537.32 & BA-140	604.70 * CS-134	610.33 * RU-103
621.04 * RU-106	636.97 & I-131	661.66 * CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 * NB-95	795.84 & CS-134	810.77 & CO-58
834.84 * MN-54	1099.25 & FE-59	1115.55 * ZN-65	1173.24 * CO-60
1291.60 * FE-59	1332.50 * CO-60	1596.18 * LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.

See 11-1-07

Sample description
TWW-7179 3.5 LITER
04-OCT-2007 12:00 BG

Spectrum Filename: C:\User\37750.Aml

Acquisition information

Start time 26-Oct-2007 13:33:20
Live time 10695
Real time 10709
Dead time .13%
Detector/Geometry IDs 3 & 0

Detector system

MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG N23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	04-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Geometry correction NO
 Random summing NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 26-OCT-2007 16:31:46 Page 2
 Environmental Inc Spectrum name: 37750.Anl

Energy calibration normalized difference: .1373

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
703.81	351.86	93.	99.	7.712E+03	39.28	1.179	PB-214
1021.63	510.79	114.	197.	2.025E+04	27.48	2.313	TL-208 s
1218.21	609.09	53.	88.	1.031E+04	31.66	1.362	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.24	133.03	114.	14.	.001	309.71	.614s
CE-141	291.04	145.44	257.	14.	.001	327.12	1.071D
I-131	568.30	284.09	45.	23.	.002	148.85	1.188
BA-140	611.00	305.45	55.	0.	.000	.00	.000s
LA-140	656.00	327.95	41.	5.	.000	331.35	.245s
I-131	728.77	364.34	49.	20.	.002	190.53	2.391s
BE-7	954.92	477.43	37.	4.	.000	441.59	.956
LA-140	972.00	485.97	29.	4.	.000	393.70	.000s
RU-103	993.00	496.48	19.	0.	.000	871.78	.208s
BA-140	1073.65	536.81	33.	0.	.001	220.69	.537s
CS-134	1209.42	604.70	23.	5.	.000	301.79	1.360D
RU-103	1220.68	610.33	51.	0.	.000	.00	.230D
RU-106	1243.87	621.93	28.	24.	.002	91.84	.911s
I-131	1276.08	638.04	29.	11.	.001	176.78	.489s
CS-137	1323.91	661.95	20.	5.	.000	268.33	.507s
ZR-95	1447.28	723.65	25.	13.	.001	151.00	.591s
ZR-95	1510.89	755.46	20.	20.	.002	120.12	.822s
NB-95	1532.17	766.10	11.	1.	.000	794.42	.397s
CS-134	1592.28	796.16	20.	6.	.001	234.87	.456s
CO-58	1621.50	810.77	7.	0.	.000	529.15	.583s
MN-54	1668.00	834.02	13.	1.	.000	640.31	.118s
FE-59	2199.00	1099.55	3.	1.	.000	346.41	.000s
ZN-65	2230.56	1115.33	4.	1.	.000	400.00	.637s
CO-60	2344.81	1172.46	6.	13.	.001	91.45	.660s
FE-59	2579.08	1289.60	16.	10.	.001	191.74	.474s
CO-60	2666.00	1333.06	3.	0.	.000	346.41	.250s
K-40	2921.98	1461.06	16.	46.	.004	49.83	.677s
LA-140	3191.65	1595.90	5.	11.	.001	101.55	1.944

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.2607E+01	3.0123E+01
K-40	<	5.6031E+01	5.6031E+01
MN-54	<	1.9627E+00	2.0612E+00
FE-59	<	1.9113E+00	2.6950E+00
CO-58	<	1.4216E+00	1.7643E+00
CO-60	<	2.0607E+00	2.0771E+00
ZN-65	<	2.2021E+00	2.4290E+00
ZR-95	<	5.0037E+00	6.3540E+00
NB-95	<	1.6234E+00	2.5112E+00
RU-103	<	1.7622E+00	2.6016E+00
RU-106	<	2.5903E+01	2.7005E+01
I-131	<	2.3630E+00	1.5906E+01
CS-134	<	1.9372E+00	1.9769E+00
CS-137	<	2.4913E+00	2.4948E+00
BA-140	<	0.4732E+00	2.0093E+01
LA-140	<	1.0037E+00	6.2454E+00
CE-141	<	5.6214E+00	8.9995E+00
CE-144	<	1.7629E+01	1.0601E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	204.30 % I-131	304.04 & BA-140
328.76 & LA-140	364.48 % I-131	477.61 % BE-7	487.02 & LA-140
497.00 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 & RU-103
621.04 % RU-106	636.97 & I-131	661.66 % CS-137	724.10 % ZR-95
756.72 & ZR-95	765.79 % NB-95	795.04 % CS-134	810.77 % CO-58
834.04 & MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 & FE-59	1332.50 % CO-60	1460.01 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

- Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-7100 3.5 LITER
04-OCT-2007 12:00 BG

SWC
11-1-07

Spectrum Filename: C:\User\17739.An1

Acquisition information

Start time 27-Oct-2007 12:52:30
Live time 30000
Real time 30036
Dead time .12%
Detector/Geometry IDs 1 & 0

Detector system
MCE 1 Input 1

Calibration

Filename: d1g1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:50
MG #23 Geometry #1
3.5 Liter water in ME

Zero offset -1.900 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 50.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Status

Comments

Corrections	Status	Comments
Decay correct to date	YES	04-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

Geometry correction
Random summing

NO
NO

EG&G ORTEC G V - I (175) WAN32 14W02.96 28-OCT-2007 18:24:37 Page 2
Environmental Inc Spectrum name: 17739.Anl

Energy calibration normalized difference: .1629

***** UNIDENTIFIED PEAK SUMMARY *****								
PEAK CENTROID	BACKGROUND	NET AREA	EFFICIENCY	UNCERT	FWHM	SUSPECTED		
CHANNEL	ENERGY	COUNTS	COUNTS	* AREA	2 SIGMA %	keV	NUCLIDE	
188.37	92.38	1417.	366.	3.070E+04	44.08	.994	TH-234	s
282.53	139.56	1176.	178.	9.977E+03	56.37	1.643	TC-99M	D
374.88	185.81	1018.	176.	9.664E+03	53.32	1.662	U-235	D
706.27	351.83	428.	212.	1.701E+04	41.38	1.474	PB-214	
1023.82	518.91	417.	655.	6.744E+04	18.26	2.836	TL-208	s
1228.28	609.33	183.	283.	2.363E+04	23.47	1.847	BI-214	D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****								
NUCLIDE	PEAK CENTROID	BACKGROUND	NET AREA	INTENSITY	UNCERT	FWHM		
	CHANNEL	ENERGY	COUNTS	COUNTS	CTS/SEC	2 SIGMA %	keV	
CE-144	270.53	133.54	964.	36.	.001	248.63	1.640D	
CE-141	294.28	145.44	951.	46.	.002	193.28	1.645D	
I-131	570.47	283.80	349.	28.	.001	206.05	.975s	
BA-140	614.29	385.75	493.	49.	.002	176.50	.679s	
LA-140	660.55	328.92	390.	40.	.001	183.03	.557s	
I-131	731.23	364.34	450.	43.	.001	217.06	.540s	
BE-7	954.45	476.16	173.	32.	.001	140.36	1.896	
LA-140	977.70	487.81	340.	45.	.002	185.66	.616s	
RU-103	999.35	498.65	383.	63.	.002	127.00	.447s	
BA-140	1076.53	537.32	288.	13.	.000	313.82	1.815D	
CS-134	1211.03	684.70	168.	18.	.001	286.33	1.845D	
RU-103	1222.27	610.33	372.	12.	.000	453.61	1.848D	
RU-106	1243.76	621.10	132.	17.	.001	239.09	1.102s	
I-131	1279.43	638.97	152.	28.	.001	188.14	.489s	
CS-137	1320.67	659.63	120.	13.	.000	312.65	.559s	
ZR-95	1453.61	726.23	110.	23.	.001	179.55	.835s	
ZR-95	1511.22	755.09	81.	13.	.000	246.15	.845s	
NB-95	1538.93	764.96	133.	40.	.001	128.52	.595s	
CS-134	1588.98	794.85	95.	66.	.002	70.48	1.444	
CO-58	1622.00	810.59	20.	0.	.000	894.43	.000s	
MN-54	1675.13	837.21	145.	28.	.001	211.58	.634s	
FE-59	2195.42	1097.87	34.	5.	.000	341.76	.391s	
ZN-65	2227.08	1113.73	42.	16.	.001	148.95	.421s	
CO-60	2346.90	1173.76	33.	24.	.001	98.11	.582s	
FE-59	2580.50	1298.80	38.	8.	.000	247.49	.543s	
CO-60	2661.25	1331.25	21.	6.	.000	238.94	.468s	
K-40	2920.57	1461.18	61.	389.	.010	18.68	2.042	
LA-140	3189.00	1595.67	3.	0.	.000	346.41	.000s	

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER
BE-7	< 1.5824E+01	2.1354E+01	
K-40	< 4.4202E+01	4.4202E+01	
MN-54	< 2.1660E+00	2.2797E+00	
FE-59	< 2.6210E+00	3.7520E+00	
CO-58	< 8.2319E-01	1.0314E+00	
CO-60	< 1.4545E+00	1.4666E+00	
ZN-65	< 2.7200E+00	2.9126E+00	
ZR-95	< 3.0019E+00	3.8523E+00	
NB-95	< 2.0646E+00	3.2557E+00	
RU-103	< 2.3204E+00	3.4969E+00	
RU-106	< 1.8100E+01	1.8903E+01	
I-131	< 2.6700E+00	1.9547E+01	
CS-134	< 1.8370E+00	1.8763E+00	/
CS-137	< 2.0435E+00	2.0465E+00	/
BA-140	< 7.9294E+00	2.7715E+01	
LA-140	< 1.5544E+00	5.4330E+00	/
CE-141	< 4.2821E+00	6.9989E+00	
CE-144	< 1.9290E+01	2.0402E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (50.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (50.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.10 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

Sample description

TW-7181 3.5 LITER
04-OCT-2007 12:00 SAC

Sum
11-1-07

Spectrum Filename: C:\User\87706.An1

Acquisition information

Start time 25-Oct-2007 15:31:55
Live time 30000
Real time 30000
Dead time .03%
Detector/Geometry IDs B & 0

Detector system

MCA 5 Input 4

Calibration

Filename: D0g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	04-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	blk9w.pbc

Geometry correction NO
 Random summing NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 26-OCT-2007 00:52:37 Page 2
 Environmental Inc Spectrum name: 87706.Anl

Energy calibration normalized difference: .1166

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
185.09	92.64	928.	249. 1.088E+04	50.55	1.472	PB-214 s
702.69	351.43	253.	132. 1.131E+04	47.46	1.187	PB-214
1021.30	510.73	322.	607. 6.927E+04	17.62	3.067	TL-208 s
1217.02	608.99	113.	129. 1.686E+04	29.14	1.793	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.90	133.54	768.	53.	.002	150.87 1.525D
CE-141	290.70	145.44	793.	52.	.002	155.99 1.532D
I-131	567.06	204.01	333.	41.	.001	166.91 .704s
BA-140	608.04	304.10	358.	55.	.002	140.22 1.119
LA-140	656.55	328.36	149.	25.	.001	133.18 .413s
I-131	729.52	364.04	153.	30.	.001	130.39 1.006s
BE-7	956.00	478.00	115.	0.	.000	3499.21 .000s
LA-140	972.67	406.41	194.	46.	.002	133.05 .951s
RU-103	995.00	497.50	55.	0.	.000	.00 .000s
BA-140	1072.29	536.22	163.	35.	.001	157.56 1.030s
CS-134	1209.24	604.70	72.	11.	.000	230.83 1.790D
RU-103	1220.50	610.33	97.	0.	.000	.00 1.730D
RU-106	1244.32	622.24	75.	23.	.001	136.94 .731s
I-131	1270.00	635.00	110.	6.	.000	664.57 .000s
CS-137	1322.96	661.56	100.	17.	.001	220.20 .760s
ZR-95	1447.53	723.05	51.	6.	.000	395.30 .665s
ZR-95	1514.00	757.09	27.	0.	.000	.00 .000s
NB-95	1529.11	764.64	56.	10.	.000	252.45 .519s
CS-134	1593.20	796.69	60.	12.	.000	230.94 .734s
CO-58	1619.32	809.75	82.	24.	.001	156.35 .830s
MN-54	1668.20	834.19	17.	0.	.000	824.62 .333s
FE-59	2202.30	1101.27	31.	29.	.001	82.98 .504s
ZN-65	2230.89	1115.57	17.	5.	.000	215.78 .459s
CO-60	2343.36	1171.02	60.	26.	.001	151.13 .371s
FE-59	2505.51	1292.91	26.	25.	.001	95.10 .515s
CO-60	2666.27	1333.30	25.	36.	.001	70.53 .611s
K-40	2920.68	1460.53	29.	193.	.006	21.65 2.691
LA-140	3193.00	1596.73	6.	0.	.000	489.90 .000s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	1.3759E+01	1.0116E+01	
K-40	<	3.8569E+01	3.8569E+01	
MN-54	<	1.0635E+00	1.1147E+00	
FE-59	<	2.8237E+00	3.9250E+00	
CO-58	<	1.7949E+00	2.2076E+00	
CO-60	<	1.4295E+00	1.4404E+00	
ZN-65	<	1.9956E+00	2.1192E+00	
ZR-95	<	1.7865E+00	2.2461E+00	
NB-95	<	1.5121E+00	2.2970E+00	
RU-103	<	1.0938E+00	1.5888E+00	
RU-106	<	1.5570E+01	1.6202E+01	
I-131	<	1.6341E+00	1.0161E+01	
CS-134	<	1.3522E+00	1.3787E+00	
CS-137	<	2.0130E+00	2.0157E+00	
BA-140	<	7.5988E+00	2.3969E+01	
LA-140	<	8.8545E-01	2.7929E+00	
CE-141	<	3.9364E+00	6.1799E+00	
CE-144	<	1.7319E+01	1.0233E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-7102 3.5 LITER
08-OCT-2007 12:00 BG

June 11-1-07

Spectrum Filename: C:\User\47618.Ani

Acquisition information

Start time 26-Oct-2007 13:39:48
Live time 10499
Real time 10513
Dead time .13%
Detector/Geometry IDs 4 & 4

Detector system
MCP 1 Input 4

Calibration

Filename: D4g1.Clb
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB

Zero offset -.130 keV; Gain .500 keV/channel
Quadratic $-.197E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	08-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.ptc

Geometry correction
Random summing

NO
NO

EG&G ORTEC 0 V - I (175) WAN32 I4W02.96 26-OCT-2007 16:34:58 Page 2
Environmental Inc Spectrum name: 47610.Ani

Energy calibration normalized difference: .2643

```
***** UNIDENTIFIED PEAK SUMMARY *****
PEAK CENTROID BACKGROUND NET AREA EFFICIENCY UNCERT FWHM SUSPECTED
CHANNEL ENERGY COUNTS COUNTS * AREA 2 SIGMA % keV NUCLIDE
-----
1020.09 510.44 109. 147. 2.594E+04 36.84 2.335 J-133 s
```

s Peak fails shape tests.
D Peak area deconvoluted.

```
***** IDENTIFIED PEAK SUMMARY *****
NUCLIDE PEAK CENTROID BACKGROUND NET AREA INTENSITY UNCERT FWHM
CHANNEL ENERGY COUNTS COUNTS CTS/SEC 2 SIGMA % keV
-----
CE-144 267.27 133.54 490. 50. .005 297.84 .518s
CE-141 290.58 145.20 243. 66. .006 118.30 1.910s
I-131 570.03 284.96 154. 61. .006 137.35 1.679s
BA-140 611.40 305.65 79. 6. .001 402.44 .697s
LA-140 656.52 328.21 105. 47. .004 148.75 2.041s
I-131 729.47 364.70 72. 36. .003 145.30 1.375s
BE-7 955.00 477.49 23. 1. .000 1127.44 .378s
LA-140 972.25 486.12 40. 9. .001 216.30 1.528
RU-103 992.76 496.38 70. 23. .002 143.11 1.051s
BA-140 1074.17 537.09 34. 5. .000 341.76 1.117
CS-134 1209.36 604.70 33. 2. .000 927.43 1.665D
RU-103 1220.62 610.33 54. 15. .001 146.96 1.669D
RU-106 1243.17 621.61 16. 3. .000 343.36 .445s
I-131 1274.10 637.07 28. 10. .001 211.11 .450s
CS-137 1322.67 661.36 13. 1. .000 640.31 .348s
ZR-95 1447.06 723.57 17. 12. .001 130.43 1.095s
ZR-95 1512.84 756.47 26. 17. .002 129.41 .770s
NB-95 1531.15 765.62 16. 7. .001 200.75 .345s
CS-134 1592.67 796.38 9. 6. .001 157.53 .441s
CO-58 1616.23 808.17 16. 14. .001 126.17 .560s
MN-54 1669.00 834.56 11. 0. .000 763.03 .500s
FE-59 2194.32 1097.25 9. 16. .002 88.82 .847s
ZN-65 2231.82 1116.01 8. 4. .000 251.66 .465s
CO-60 2344.43 1172.32 6. 4. .000 178.89 .476s
FE-59 2582.00 1291.11 5. 1. .000 412.31 .000s
CO-60 2657.08 1328.66 13. 8. .001 231.54 .522s
K-40 2920.12 1460.19 13. 125. .012 24.67 2.542
LA-140 3193.64 1596.95 1. 4. .000 146.59 2.363
```

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	3.0441E+01	3.0507E+01	
K-40		2.7302E+02	2.7302E+02	9.405E+01
MN-54	<	3.1933E+00	3.3240E+00	
FE-59	<	6.4806E+00	8.5866E+00	
CO-58	<	4.3632E+00	5.2073E+00	
CO-60	<	5.2463E+00	5.2006E+00	
ZN-65	<	6.7129E+00	7.0666E+00	
ZR-95	<	9.0435E+00	1.0998E+01	
NB-95	<	3.5476E+00	5.0709E+00	
RU-103	<	5.4975E+00	7.5634E+00	
RU-106	<	3.6523E+01	3.7787E+01	
I-131	<	5.2626E+00	2.5081E+01	
CS-134	<	4.1501E+00	4.2277E+00	
CS-137	<	3.8308E+00	3.8352E+00	
BA-140	<	1.5461E+01	4.1260E+01	
LA-140	<	4.7754E+00	1.2744E+01	
CE-141	<	7.9454E+00	1.1681E+01	
CE-144	<	4.8403E+01	5.0577E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 2.7301640E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 2.7301640E+02 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.04 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1596.18 % LA-140	

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

Sample description
TWW-7183 3.5 LITER
00-OCT-2007 12:00 BG

Sm
11-1-07

Spectrum Filename: C:\User\57541.Ani

Acquisition information

Start time 26-Oct-2007 16:53:01
Live time 12678
Real time 12601
Dead time .03%
Detector/Geometry IDs 5 & 0

Detector system
MCE 5 Input 1

Calibration

Filename: D5g1.C1b
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB

Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4048 for an energy of 2031.42keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit methods:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	00-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc

10-Aug-2007 09:55:42

Energy calibration normalized difference: 1.0000
 No unknown peaks passed sensitivity test.

***** IDENTIFIED PEAK SUMMARY *****							
NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	254.11	132.03	155.	24.	.002	171.77	.429s
CE-141	283.50	146.53	120.	22.	.002	173.28	.751s
I-131	562.92	284.56	101.	20.	.002	195.82	.585s
BA-140	601.52	303.65	80.	25.	.002	148.59	.486s
LA-140	652.58	328.92	63.	21.	.002	147.33	1.682
I-131	724.00	364.27	14.	0.	.000	748.33	.000s
BE-7	955.65	479.07	31.	7.	.001	257.45	.563s
LA-140	973.48	487.91	35.	36.	.003	81.87	1.000s
RU-103	994.00	498.10	15.	2.	.000	401.02	.000s
BA-140	1072.00	536.81	3.	1.	.000	400.00	.124s
CS-134	1210.00	605.36	5.	0.	.000	447.21	.000s
RU-103	1219.99	610.33	20.	0.	.000	.00	.499D
RU-106	1245.00	622.76	7.	1.	.000	529.15	.000s
I-131	1276.16	638.26	17.	9.	.001	179.19	.952s
CS-137	1316.16	658.15	30.	15.	.001	170.44	.600s
ZR-95	1451.15	725.33	14.	14.	.001	108.87	.615s
ZR-95	1513.00	756.14	4.	1.	.000	447.21	.187s
NB-95	1531.00	765.10	3.	1.	.000	452.16	.561s
CS-134	1591.33	795.17	2.	1.	.000	382.97	.393s
CO-58	1622.76	810.84	7.	5.	.000	184.75	.653s
MN-54	1671.60	835.20	20.	15.	.001	129.96	.798s
FE-59	2201.27	1099.94	5.	4.	.000	180.87	.487s
ZN-65	2234.18	1116.42	4.	3.	.000	220.73	.475s
CO-60	2349.56	1174.24	3.	9.	.001	94.28	.766s
FE-59	2582.20	1291.00	2.	9.	.001	96.65	1.175s
CO-60	2663.25	1331.72	3.	9.	.001	102.63	1.452s
K-40	2917.29	1459.53	3.	22.	.002	54.14	1.036s
LA-140	3183.67	1593.82	5.	2.	.000	311.68	.738s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****			
NUCLIDE	TIME OF COUNT ACTIVITY	TIME CORRECTED ACTIVITY	UNCERTAINTY 2 SIGMA COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER

BE-7	<	3.2788E+01	4.1548E+01
K-40	<	6.2634E+01	6.2634E+01
MN-54	<	4.5854E+00	4.7745E+00
FE-59	<	4.4782E+00	5.9459E+00

CO-60	<	3.8213E+00	3.8464E+00
ZN-65	<	4.7573E+00	5.0098E+00
ZR-95	<	4.7371E+00	5.7691E+00
NB-95	<	2.8000E+00	4.0129E+00
RU-103	<	2.8602E+00	3.9443E+00
RU-106	<	2.7572E+01	2.8534E+01
I-131	<	2.4786E+00	1.1951E+01
CS-134	<	1.7749E+00	1.8048E+00
CS-137	<	5.0287E+00	5.0345E+00
BA-140	<	4.5077E+00	1.2117E+01
LA-140	<	5.3746E+00	1.4448E+01
CE-141	<	6.8630E+00	8.9392E+00
CE-144	<	3.0337E+01	3.1710E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 & CE-144	145.44 & CE-141	284.30 % I-131	304.84 & BA-140
328.76 % LA-140	364.48 % I-131	477.61 & BE-7	487.02 & LA-140
497.08 & RU-103	537.32 % BA-140	604.70 % CS-134	610.33 & RU-103
621.84 & RU-106	636.97 & I-131	661.66 & CS-137	724.18 & ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 & K-40	1596.18 & LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FWHM, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction

Sample description
TWW-7104 3.5 LITER
08-OCT-2007 12:00 SAC

Smc
11-1-07

Spectrum Filename: C:\User\87707.Anl

Acquisition information

Start time 26-Oct-2007 08:54:29
Live time 8042
Real time 8044
Dead time .03%
Detector/Geometry IDs 8 & 0

Detector system
MCB 5 Input 4

Calibration

Filename: D0g1.Clb
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	08-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg&w.pbc

10-Aug-2007 10:05:21

Energy calibration normalized difference: .0389

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET COUNTS	AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
703.10	351.63	96.	92.	7.939E+03	50.28	1.047	PE-214
1021.38	510.77	67.	101.	2.060E+04	27.18	2.058	TL-208 s
1216.93	608.55	37.	69.	8.936E+03	34.95	1.793	XE-135 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	267.00	133.59	80.	4.	.000	525.99 .000s
CE-141	291.95	146.07	73.	10.	.001	214.46 .533s
I-131	563.10	281.63	112.	14.	.002	290.78 .709s
BA-140	610.00	305.08	77.	0.	.000	.00 .000s
LA-140	654.94	327.55	44.	13.	.002	170.14 .970s
I-131	730.50	365.33	55.	15.	.002	187.77 .559s
BE-7	954.98	477.57	23.	16.	.002	123.40 .750s
LA-140	973.00	486.58	9.	0.	.000	600.00 .000s
RU-103	994.83	497.49	35.	7.	.001	317.73 .461s
BA-140	1073.00	536.50	12.	1.	.000	824.62 .000s
CS-134	1209.24	604.70	39.	0.	.000	.00 1.790D
RU-103	1220.50	610.33	81.	7.	.001	394.23 1.794D
RU-106	1240.00	620.08	21.	8.	.001	210.65 .000s
I-131	1272.00	636.08	6.	0.	.000	489.90 .000s
CS-137	1318.49	659.33	13.	11.	.001	139.19 .915s
ZR-95	1449.54	724.86	20.	19.	.002	109.72 1.333
ZR-95	1513.49	756.84	11.	5.	.001	239.34 .353s
NB-95	1534.30	767.24	15.	12.	.002	131.85 .902s
CS-134	1593.00	796.59	22.	9.	.001	217.71 .486s
CO-58	1620.93	810.56	5.	2.	.000	311.68 .371s
MN-54	1669.40	834.80	23.	16.	.002	142.47 .833s
FE-59	2197.00	1090.62	4.	1.	.000	557.77 .000s
ZN-65	2231.00	1115.63	1.	0.	.000	200.00 .000s
CO-60	2347.98	1174.08	5.	10.	.001	100.96 1.158s
FE-59	2583.56	1291.94	6.	14.	.002	101.02 1.306s
CO-60	2663.55	1331.94	3.	1.	.000	529.15 .625s
K-40	2921.05	1460.72	5.	39.	.005	41.03 1.778
LA-140	3190.57	1595.51	2.	1.	.000	382.97 .656s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED ACTIVITY	UNCERTAINTY COUNTING	2 SIGMA
		ACTIVITY		
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	2.3306E+01	2.3406E+01	
K-40	<	7.2314E+01	7.2314E+01	
MN-54	<	3.8117E+00	3.9660E+00	
FE-59	<	4.3244E+00	5.7121E+00	
CO-58	<	1.6792E+00	2.0001E+00	
CO-60	<	1.8350E+00	1.8469E+00	
ZN-65	<	1.0235E+00	1.9105E+00	
ZR-95	<	4.1331E+00	5.0154E+00	
NB-95	<	2.8919E+00	4.1174E+00	
RU-103	<	3.2450E+00	4.4408E+00	
RU-106	<	3.0609E+01	3.1657E+01	
I-131	<	3.6169E+00	1.6945E+01	
CS-134	<	3.7071E+00	3.7605E+00	
CS-137	<	2.8201E+00	2.8233E+00	
BA-140	<	7.9113E+00	2.0806E+01	
LA-140	<	1.8727E+00	4.9439E+00	
CE-141	<	4.4719E+00	6.5467E+00	
CE-144	<	2.0987E+01	2.1919E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	204.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	610.33 % RU-103	621.84 % RU-106
636.97 % I-131	661.66 % CS-137	724.18 % ZR-95	756.72 % ZR-95
765.79 % NB-95	795.84 % CS-134	810.77 % CO-58	834.84 % MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- # - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-7185 3.5 LITER
02-NOV-2007 12:00 EG

*Known Cs-137
98.4 pCi/L*

Spectrum Filename: C:\User\17759.Anl

Acquisition information

Start time 03-Nov-2007 09:29:00
Live time 7514
Real time 7523
Dead time .12%
Detector/Geometry IDs 1 & 0

*Sum
11-5-07*

Detector system
MCE 1 Input 1

Calibration

Filename: d1g1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:50
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum)..

Corrections

Status	Comments
Decay correct to date YES	02-Nov-2007 12:00:00
Decay during acquisition YES	
Decay during collection NO	
Peaked background correction YES	bkg1w.pbc
	10-Aug-2007 10:00:43

Energy calibration normalized difference: .1991

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1220.14	609.26	47.	117.	1.363E+04	24.77	1.047	BI-214 D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	267.00	131.01	285.	46.	.006	130.51	.273s
CE-141	294.20	145.44	219.	0.	.000	.00	1.645
I-131	570.38	283.76	99.	17.	.002	107.19	.300s
BA-140	610.09	303.65	133.	22.	.003	199.29	.445s
LA-140	656.50	326.94	190.	40.	.006	131.63	.461s
I-131	731.33	364.39	120.	26.	.003	173.03	.574s
BE-7	957.06	477.47	30.	0.	.001	190.39	.410s
LA-140	975.85	486.80	32.	4.	.001	348.79	.502s
RU-103	999.86	490.91	83.	28.	.004	132.12	.901s
BA-140	1076.11	537.11	31.	23.	.003	87.00	1.299
CS-134	1211.03	604.70	36.	3.	.000	595.31	1.045D
RU-103	1222.27	610.33	162.	0.	.000	.00	1.040D
RU-106	1244.00	621.22	13.	0.	.000	721.11	.209s
I-131	1274.42	636.46	16.	4.	.001	300.00	.732s
CS-137	1324.62	661.61	61.	739.	.098	0.04	1.643
ZR-95	1451.02	725.33	24.	20.	.003	102.05	.017s
ZR-95	1511.61	755.20	17.	9.	.001	179.19	.666s
NB-95	1531.43	765.22	32.	9.	.001	260.10	.515s
CS-134	1592.00	795.56	0.	0.	.000	653.20	.000s
CO-50	1621.33	810.26	9.	2.	.000	447.21	1.053s
MN-54	1669.14	834.20	12.	7.	.001	160.32	1.370
FE-59	2197.00	1090.66	9.	3.	.000	305.51	.559s
ZN-65	2220.11	1114.25	7.	19.	.002	73.05	.711s
CO-60	2342.69	1171.65	6.	12.	.002	100.00	.597s
FE-59	2503.00	1292.05	4.	2.	.000	316.23	.501s
CO-60	2663.60	1332.43	5.	0.	.001	122.20	.505s
K-40	2921.43	1461.61	7.	43.	.006	40.46	.767s
LA-140	3100.20	1595.27	2.	2.	.000	320.00	.410s

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.6055E+01	2.7169E+01	
K-40	<	0.3819E+01	0.3819E+01	
MN-54	<	2.6396E+00	2.6449E+00	
FE-59	<	5.3397E+00	5.4147E+00	
CO-58	<	2.1362E+00	2.1550E+00	
CO-60	<	2.7806E+00	2.7815E+00	
ZN-65	<	4.2849E+00	4.2958E+00	
ZR-95	<	5.5507E+00	5.6047E+00	
NE-95	<	4.0572E+00	4.1296E+00	
RU-103	<	4.0523E+00	4.9296E+00	
RU-106	<	2.5396E+01	2.5439E+01	
I-131	<	5.4339E+00	5.8710E+00	
CS-134	<	3.4017E+00	3.4045E+00	
CS-137		1.0908E+02	1.0909E+02	9.706E+00
BA-140	<	1.2370E+01	1.2986E+01	
LA-140	<	3.4062E+00	3.5759E+00	
CE-141	<	0.1850E+00	0.3427E+00	
CE-144	<	4.1826E+01	4.1917E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (50.1 to 2026.1 keV) 1.0907940E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (50.1 to 2026.1 keV) 1.0908560E+02 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	284.30	% I-131	304.84 & BA-140	329.76 & LA-140
364.48 % I-131	477.61	% BE-7	487.02 % LA-140	497.08 & RU-103
537.32 % BA-140	604.70	% CS-134	610.33 ! RU-103	621.84 % RU-106
636.97 % I-131	724.18	& ZR-95	756.72 & ZR-95	765.79 % NE-95
795.84 % CS-134	810.77	% CO-58	834.84 % MN-54	1099.25 % FE-59
1115.55 & ZN-65	1173.24	& CO-60	1291.60 % FE-59	1332.50 % CO-60
1460.81 % K-40	1596.10	% LA-140		

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

Sample description
TWW-7186 3.5 LITER
02-NOV-2007 12:00 AMS

Swc
11-6-07

Spectrum Filename: C:\User\37775.Anl

Acquisition information

Start time 03-Nov-2007 11:43:04
Live time 0000
Real time 0004
Dead time .05%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB
Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4040 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	02-Nov-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc
		10-Aug-2007 10:00:17

Energy calibration normalized difference: .1948

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
703.79	351.85	116.	88. 6.816E+03	51.67	1.398	RE-214 s
1021.61	510.70	100.	126. 1.294E+04	38.78	1.894	TL-208 s
1210.51	609.25	29.	76. 8.900E+03	30.41	1.362	BI-214 D
2240.27	1120.18	10.	23. 4.279E+03	56.53	1.650	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	267.59	133.71	220.	96.	.012	99.83 1.209s
CE-141	289.39	144.61	179.	43.	.005	169.15 .541s
I-131	568.71	284.30	120.	8.	.001	402.35 1.161D
BA-140	609.66	304.78	80.	49.	.006	118.93 1.230s
LA-140	657.67	328.78	39.	0.	.000	.00 .352s
I-131	728.00	363.96	27.	0.	.000	1039.23 .250s
BE-7	956.26	478.10	44.	9.	.001	218.86 .883
LA-140	973.00	486.47	20.	2.	.000	535.41 .000s
RU-103	992.59	496.27	28.	12.	.002	137.44 .881
BA-140	1073.37	536.66	43.	11.	.001	233.52 .463s
CS-134	1209.42	604.70	38.	11.	.001	151.77 1.360D
RU-103	1220.60	610.33	35.	0.	.000	.00 .277D
RU-106	1245.70	622.84	25.	7.	.001	245.51 .883s
I-131	1273.10	636.55	20.	5.	.001	277.64 1.015
CS-137	1322.78	661.39	33.	769.	.096	7.89 1.313
ZR-95	1448.32	724.17	6.	10.	.001	93.81 .846s
ZR-95	1515.35	757.69	9.	3.	.000	308.40 .471s
NB-95	1533.14	766.58	8.	4.	.000	220.54 .413s
CS-134	1593.68	796.86	11.	6.	.001	221.19 .403s
CO-58	1621.84	810.94	13.	5.	.001	229.37 .519s
MN-54	1665.34	832.69	28.	19.	.002	128.78 .439s
FE-59	2199.00	1099.55	3.	1.	.000	346.41 .000s
ZN-65	2230.99	1115.55	10.	10.	.001	105.10 1.648D
CO-60	2345.00	1172.55	5.	0.	.000	577.35 .000s
FE-59	2581.32	1290.72	4.	5.	.001	158.18 .847s
CO-60	2665.19	1332.66	6.	4.	.001	202.39 .589s
K-40	2921.07	1460.61	2.	38.	.005	36.33 .917s
LA-140	3190.39	1595.27	3.	15.	.002	79.64 .951s

s Peak fails shape tests.
 D Peak area deconvoluted.



Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

700 Landwehr Road • Northbrook, IL 60062-2310
ph. (847) 564-0700 • fax (847) 564-4517

Mr. Al Percival
FirstEnergy Corporation
Mail Stop 1041
5501 North State Route 2
Oak Harbor, Ohio 43449

LABORATORY REPORT NO.: 8003-100-371
DATE: 11-06-07
SAMPLES RECEIVED: 10-19-07
PURCHASE ORDER NO.:

Dear Mr. Percival

Enclosed are results of the analyses for tritium and gamma-emitting isotopes in twenty-one ground water samples.

Should you have any questions or other concerns, please do not hesitate to call.

Sincerely,

S.A. Coorlim,
Quality Assurance

Brorja Grob, M. S.
Laboratory Manager

SAMPLES RETAINED THIRTY DAYS AFTER ANALYSIS

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MW-30D	MW-37S	MW-20S	DBD-02	MW-33S
Date Collected	10/9/2007	10/9/2007	10/9/2007	10/9/2007	10/5/2007
Time Collected	10:02	12:29	14:48	12:00	9:55
Lab Code	TWW- 7166	TWW- 7167	TWW- 7168	TWW- 7169	TWW- 7170
Isotope	Concentration (pCi/L)				
H-3	< 174	1231 ± 130	189 ± 94	218 ± 95	1110 ± 127
Mn-54	< 3.2	< 2.1	< 2.3	< 2.0	< 1.4
Fe-59	< 7.7	< 3.9	< 6.2	< 4.0	< 3.8
Co-58	< 3.4	< 1.8	< 3.0	< 1.9	< 2.1
Co-60	< 2.8	< 1.9	< 1.4	< 2.5	< 1.8
Zn-65	< 5.4	< 5.7	< 2.4	< 2.9	< 3.9
Zr-Nb-95	< 4.7	< 2.8	< 2.2	< 4.1	< 3.2
Cs-134	< 2.3	< 2.3	< 2.8	< 2.1	< 2.0
Cs-137	< 2.1	< 2.0	< 3.9	< 2.9	< 2.4
Ba-La-140	< 6.5	< 3.2	< 2.6	< 4.0	< 6.7

Sample Location	MW-33S	MW-33D	MW-31S	DBD-03	MW-20D
Date Collected	10/5/2007	10/5/2007	10/5/2007	10/5/2007	10/10/2007
Time Collected	9:55	11:33	14:10	12:00	10:35
Lab Code	TWW- 7171	TWW- 7172	TWW- 7173	TWW- 7174	TWW- 7175
Isotope	Concentration (pCi/L)				
H-3	1230 ± 130	1934 ± 150	3149 ± 178	3012 ± 175	< 174
Mn-54	< 1.5	< 1.4	< 1.0	< 1.2	< 1.8
Fe-59	< 4.5	< 3.4	< 2.4	< 5.0	< 5.1
Co-58	< 2.7	< 1.2	< 1.7	< 1.6	< 2.1
Co-60	< 2.2	< 1.6	< 1.4	< 1.3	< 1.5
Zn-65	< 3.3	< 1.7	< 3.0	< 2.5	< 4.0
Zr-Nb-95	< 4.2	< 2.2	< 2.2	< 3.0	< 2.6
Cs-134	< 2.6	< 1.3	< 1.4	< 1.9	< 2.5
Cs-137	< 2.6	< 1.3	< 1.6	< 1.9	< 3.0
Ba-La-140	< 9.4	< 5.1	< 2.6	< 5.1	< 6.1

The error given is the probable counting error at the 95% confidence level.
Less than (<), value is based on a 4.66 sigma counting error for the background sample.

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MW-23S	MW-15S	MW-15D	MW-12S	MW-12D
Date Collected	10/10/2007	10/10/2007	10/7/2007	10/4/2007	10/4/2007
Time Collected	12:50	14:12	16:52	10:48	13:38
Lab Code	TWW- 7176	TWW- 7177	TWW- 7178	TWW- 7179	TWW- 7180
Isotope	Concentration (pCi/L)				
H-3	306 ± 99	301 ± 99	442 ± 104	276 ± 98	738 ± 115
Mn-54	< 2.4	< 3.2	< 2.8	< 2.1	< 2.3
Fe-59	< 3.8	< 6.6	< 5.9	< 2.7	< 3.8
Co-58	< 1.6	< 3.2	< 3.5	< 1.8	< 1.0
Co-60	< 2.2	< 3.0	< 2.5	< 2.1	< 1.5
Zn-65	< 3.4	< 2.2	< 3.9	< 2.4	< 2.9
Zr-Nb-95	< 3.9	< 5.0	< 2.2	< 2.5	< 3.3
Cs-134	< 2.3	< 2.6	< 2.7	< 2.0	< 1.9
Cs-137	< 2.9	< 3.5	< 2.6	< 2.5	< 2.0
Ba-La-140	< 5.1	< 7.6	< 7.8	< 6.2	< 5.4

Sample Location	DBD-01	MW-31D	MW-105A	MW-30S	MS01-MW-30S
Date Collected	10/4/2007	10/8/2007	10/8/2007	10/8/2007	10/8/2007
Time Collected	12:00	9:47	12:41	15:25	15:25
Lab Code	TWW- 7181	TWW- 7182	TWW- 7183	TWW- 7184	TWW- 7185 ^a
Isotope	Concentration (pCi/L)				
H-3	769 ± 116	183 ± 94	1832 ± 147	494 ± 106	26895 ± 467
Mn-54	< 1.1	< 3.3	< 4.8	< 4.0	< 2.7
Fe-59	< 3.9	< 8.6	< 5.9	< 5.7	< 5.4
Co-58	< 2.2	< 5.2	< 3.3	< 2.0	< 2.2
Co-60	< 1.4	< 5.3	< 3.8	< 1.8	< 2.8
Zn-65	< 2.1	< 7.1	< 5.0	< 1.9	< 4.3
Zr-Nb-95	< 2.3	< 5.1	< 4.0	< 4.1	< 4.1
Cs-134	< 1.4	< 4.2	< 1.8	< 3.8	< 3.4
Cs-137	< 2.0	< 3.8	< 5.0	< 2.8	109.1 ± 9.7
Ba-La-140	< 2.8	< 12.7	< 14.4	< 4.9	< 3.6

^a Known spike activ Cs-137, 98.4 pCi/L.
H-3, 27,496 pCi/L.

The error given is the probable counting error at the 95% confidence level.

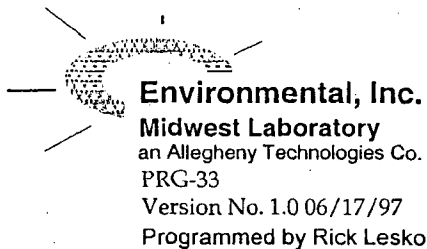
Less than (<), value is based on a 4.66 sigma counting error for the background sample.

Table 1. Results of analyses for tritium and gamma-emitting isotopes in fourteen ground water samples.

Sample Location	MSD01-MW-30S
Date Collected	10/8/2007
Time Collected	12:00
Lab Code	TWW- 7186 ^a
Isotope	Concentration (pCi/L)

H-3	26895 ± 467
Mn-54	< 3.7
Fe-59	< 2.5
Co-58	< 2.5
Co-60	< 3.0
Zn-65	< 5.1
Zr-Nb-95	< 1.9
Cs-134	< 2.9
Cs-137	108.4 ± 8.6
Ba-La-140	< 2.2

The error given is the probable counting error at the 95% confidence level.
Less than (<), value is based on a 4.66 sigma counting error for the background sample.



TRITIUM

RESULTS SHEET

For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: *Sae*
 Date approved: 10/21/07

Sample Count Time (min.): 100
 Background Count Time (min.): 200
 Background Counts: 594

Standard Count Time (min.): 200
 Standard Counts: 57905
 Counter Efficiency: 0.188

Date Counted: 10/21/2007
 Calculated by: Rick
 Date Calculated: 10/22/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00 Sigma	4.66 Sigma
					Activity	Error			
TWW-6754	10/2/2007	13.0	425	0.997	236.752 ± 88.589		94.259	95.628	148.541
TWW-6757	10/2/2007	13.0	322	0.997	46.241 ± 80.240		80.487	95.628	148.541
TWW-6758	10/2/2007	13.0	310	0.997	24.045 ± 79.211		79.278	95.628	148.541
TWW-6759	9/25/2007	13.0	371	0.996	137.020 ± 84.406		86.439	95.731	148.701
TWW-6765	10/1/2007	13.0	510	0.997	394.031 ± 94.942		109.021	95.642	148.564
TWW-6766	9/28/2007	13.0	425	0.996	236.898 ± 88.644		94.317	95.686	148.633
TWW-6767	9/28/2007	13.0	432	0.996	249.853 ± 89.183		95.437	95.686	148.633
TWW-6769	10/3/2007	13.0	420	0.997	227.469 ± 88.189		93.457	95.613	148.519
TWW-6770	10/3/2007	13.0	496	0.997	368.019 ± 93.898		106.405	95.613	148.519

☞ =Best probable result.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA

NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

BE-7	<	3.1294E+01	3.1699E+01	
K-40	<	5.7613E+01	5.7613E+01	
MN-54	<	3.6585E+00	3.6666E+00	
FE-59	<	2.4926E+00	2.5313E+00	
CO-58	<	2.4440E+00	2.4677E+00	
CO-60	<	2.9787E+00	2.9797E+00	
ZN-65	<	5.0650E+00	5.0793E+00	
ZR-95	<	4.3052E+00	4.3515E+00	
NB-95	<	1.8620E+00	1.8987E+00	
RU-103	<	2.7506E+00	2.7990E+00	
RU-106	<	3.1642E+01	3.1700E+01	
I-131	<	2.3545E+00	2.5644E+00	
CS-134	<	2.9369E+00	2.9396E+00	
CS-137		1.0039E+02	1.0040E+02	A.602E+00
BA-140	<	1.3006E+01	1.3723E+01	
LA-140	<	2.0009E+00	2.1956E+00	
CE-141	<	6.2712E+00	6.4048E+00	
CE-144	<	3.1414E+01	3.1498E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 1.0039460E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 1.0040140E+02 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.40 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 & RU-103	537.32 % BA-140	604.70 % CS-134	610.33 & RU-103
621.84 & RU-106	636.97 % I-131	724.18 % ZR-95	756.72 & ZR-95
765.79 & NB-95	795.84 & CS-134	810.77 % CO-58	834.84 & MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 & FE-59
1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140	

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FWHM, but ok at FWHM.

% - Peak fails sensitivity test.

- Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

Sample description
TWW-6749 3.5 LITER
27-SEP-2007 12:00 BG

*See
10-17-07*

Spectrum Filename: C:\User\07656.Aml

Acquisition information

Start time 06-Oct-2007 11:30:12
Live time 9344
Real time 9346
Dead time .03%
Detector/Geometry IDs 0 & 0

Detector system
MCB 5 Input 4

Calibration

Filename: D0g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.9571E+05
Detection limit method:
RISØ method
Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	27-Sep-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg@w. pbc
		10-Aug-2007 10:05:21
Absorption (Internal)	NO	
Geometry correction	NO	

Energy calibration normalized difference: .0769

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
185.53	92.86	246.	119.	9.026E+03	53.53	1.906	PB-214 s
701.87	351.02	133.	97.	8.299E+03	58.80	1.709	CE-143
1217.72	608.94	48.	67.	8.757E+03	38.02	1.793	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.19	133.19	103.	8.	.001	314.61	.398s
CE-141	287.12	143.65	208.	22.	.002	218.31	.906s
I-131	567.48	283.82	141.	14.	.002	352.78	.480s
BA-140	611.72	305.94	63.	18.	.002	133.33	.713s
LA-140	658.23	329.20	81.	17.	.002	189.70	.534s
I-131	729.39	364.77	59.	22.	.002	119.74	.829s
BE-7	954.40	477.28	33.	9.	.001	230.94	.585s
LA-140	972.36	486.26	35.	7.	.001	272.42	1.466
RU-103	994.00	497.00	28.	4.	.000	387.30	.000s
BA-140	1072.52	536.34	26.	15.	.002	131.58	1.606
CS-134	1209.24	604.70	24.	8.	.001	179.43	1.790D
RU-103	1220.50	610.33	97.	12.	.001	229.81	1.794D
RU-106	1246.00	623.08	30.	18.	.002	130.53	1.450
I-131	1273.50	636.83	8.	0.	.000	565.69	.583s
CS-137	1325.54	662.85	18.	30.	.003	73.33	.972s
ZR-95	1447.00	723.59	5.	3.	.000	188.56	.146s
ZR-95	1514.48	757.33	8.	4.	.000	249.61	.720s
NB-95	1533.24	766.71	12.	7.	.001	168.32	1.101s
CS-134	1593.00	796.59	9.	1.	.000	947.51	.000s
CO-58	1623.33	811.76	7.	2.	.000	314.29	.943s
MN-54	1668.00	834.09	8.	0.	.000	653.20	.000s
FE-59	2199.49	1099.87	9.	14.	.001	118.70	.631s
ZN-65	2228.33	1114.29	6.	5.	.001	164.92	.979s
CO-60	2345.05	1172.66	5.	2.	.000	311.68	.675s
FE-59	2582.83	1291.57	5.	9.	.001	112.58	.913s
CO-60	2669.39	1334.86	3.	19.	.002	66.22	.963s
K-40	2920.87	1460.63	14.	52.	.006	51.98	1.218s
LA-140	3190.86	1595.66	4.	24.	.003	58.82	.803s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED ACTIVITY	UNCERTAINTY	2 SIGMA COUNTING
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	2.3740E+01	2.6683E+01	
K-40	<	7.2030E+01	7.2030E+01	
MN-54	<	2.1753E+00	2.2192E+00	
FE-59	<	4.9070E+00	5.7360E+00	
CO-58	<	1.7079E+00	1.8648E+00	
CO-60	<	1.6227E+00	1.6280E+00	
ZN-65	<	3.0445E+00	3.9439E+00	
ZR-95	<	3.1762E+00	3.5007E+00	
NB-95	<	2.2969E+00	2.7434E+00	
RU-103	<	2.4981E+00	2.9276E+00	
RU-106	<	3.0940E+01	3.1476E+01	
I-131	<	3.2173E+00	6.9935E+00	
CS-134	<	2.4064E+00	2.5070E+00	
CS-137	<	2.7634E+00	2.7650E+00	
BA-140	<	9.7075E+00	1.5815E+01	
LA-140 #		5.7010E+00	9.2079E+00 / 5.505E+00 < 5.8445E+00	5 pt slip WWS
CE-141	<	6.4520E+00	7.0147E+00	
CE-144	<	2.0507E+01	2.0960E+01	

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 5.7010030E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 9.2079300E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	204.30 % I-131	304.84 & BA-140
320.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.00 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 % RU-103
621.04 & RU-106	636.97 % I-131	661.66 & CS-137	724.10 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 & CO-58
934.84 % MN-54	1099.25 % FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 & CO-60	1460.81 % K-40	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.

Sample description
TWW-6750 3.5 LITER
27-SEP-2007 12:00 BG

Spectrum Filename: C:\User\17678.Ani

*See
10-17-07*

Acquisition information
Start time 06-Oct-2007 11:26:03
Live time 7498
Real time 7507
Dead time .11%
Detector/Geometry IDs 1 & 0

Detector system
MCB 1 Input 1

Calibration
Filename: dig1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05
Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	27-Sep-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc
		10-Aug-2007 10:08:43
Absorption (Internal)	NO	
Geometry correction	NO	

Energy calibration normalized difference: .1253

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
706.96	352.18	87.	60. 4.844E+03	56.59	1.165	PB-214 s
1023.67	510.84	112.	200. 2.060E+04	31.37	3.159	TL-208 s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	271.00	133.78	104.	0.	.000	2039.61 .000s
CE-141	293.81	145.20	113.	0.	.000	.00 .405s
I-131	571.89	284.51	112.	20.	.003	167.73 1.075s
BA-140	612.00	304.60	35.	0.	.000	1103.22 .000s
LA-140	656.55	326.92	143.	34.	.005	138.99 2.448s
I-131	733.32	365.38	115.	35.	.005	131.27 .932s
BE-7	959.74	478.81	94.	27.	.004	145.04 .651s
LA-140	976.90	487.41	31.	5.	.001	291.11 .775s
RU-103	995.97	496.96	75.	12.	.002	269.77 .918s
BA-140	1075.43	536.77	32.	8.	.001	212.13 .509s
CS-134	1211.03	604.70	31.	10.	.001	172.49 1.845D
RU-103	1222.27	610.33	67.	47.	.006	57.28 1.848D
RU-106	1247.00	622.72	45.	43.	.006	76.14 .610s
I-131	1274.41	636.45	32.	14.	.002	142.38 .685s
CS-137	1324.11	661.35	25.	7.	.001	245.51 .590s
ZR-95	1448.44	723.64	20.	19.	.003	89.53 1.471
ZR-95	1516.00	757.49	35.	12.	.002	189.05 .000s
NB-95	1534.00	766.50	14.	2.	.000	454.61 .000s
CS-134	1591.00	795.06	8.	1.	.000	600.00 .150s
CO-58	1625.67	812.43	18.	11.	.001	146.59 .515s
MN-54	1672.00	835.64	26.	2.	.000	676.12 .000s
FE-59	2198.95	1099.64	19.	6.	.001	236.55 1.782
ZN-65	2228.32	1114.35	17.	9.	.001	170.97 .779s
CO-60	2345.85	1173.24	6.	0.	.000	.00 .000D
FE-59	2580.56	1290.82	7.	4.	.001	212.13 .884s
CO-60	2655.27	1328.26	10.	12.	.002	120.19 .508s
K-40	2920.40	1461.09	14.	675.	.090	8.24 1.936
LA-140	3189.74	1596.03	8.	12.	.002	123.23 .513s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	4.5263E+01	5.0869E+01	
K-40		1.2744E+03	1.2744E+03	1.166E+02
MN-54	<	3.7065E+00	3.7811E+00	
FE-59	<	7.0983E+00	8.1633E+00	
CO-58	<	2.9648E+00	3.2371E+00	
CO-60	<	3.5994E+00	3.6111E+00	
ZN-65	<	7.0121E+00	7.1933E+00	
ZR-95	<	7.5021E+00	8.2678E+00	
NB-95	<	2.9703E+00	3.5471E+00	
RU-103	<	4.6390E+00	5.4357E+00	
RU-106	<	4.1346E+01	4.2051E+01	
I-131	<	5.3319E+00	1.1582E+01	
CS-134	<	3.1672E+00	3.1934E+00	
CS-137	<	3.7514E+00	3.7536E+00	
BA-140	<	1.2628E+01	2.0564E+01	
LA-140	<	4.3950E+00	7.1569E+00	
CE-141	<	6.0016E+00	7.2679E+00	
CE-144	<	2.5576E+01	2.6140E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 1.2743670E+03 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 1.2743670E+03 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 * CE-144	145.44 * CE-141	284.30 * I-131	304.84 * BA-140
328.76 & LA-140	364.48 & I-131	477.61 & BE-7	487.02 * LA-140
497.00 * RU-103	537.32 * BA-140	604.70 * CS-134	610.33 RU-103
621.84 * RU-106	636.97 * I-131	661.66 * CS-137	724.18 * ZR-95
756.72 * ZR-95	765.79 * NB-95	795.84 * CS-134	810.77 & CO-58
834.84 * MN-54	1099.25 * FE-59	1115.55 & ZN-65	1173.24 ? CO-60
1291.60 * FE-59	1332.50 & CO-60	1596.18 * LA-140	

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

* - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

Sample description

TWW-6751 3.5 LITER
24-SEP-2007 12:00 BG

Spectrum Filename: C:\User\37694.Anl

*See
10-17-07*

Acquisition information

Start time 06-Oct-2007 11:36:09
Live time 8676
Real time 8686
Dead time .12%
Detector/Geometry IDs 3 & 0

Detector system

MCE 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in ME

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method

Additional random error: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	24-Sep-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc
		10-Aug-2007 10:00:17
Absorption (Internal)	NO	
Geometry correction	NO	

Energy calibration normalized difference: .3659

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY % AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
703.69	351.00	83.	77.	5.972E+03	49.11	1.037	PB-214 s
1022.31	511.13	72.	166.	1.707E+04	27.00	2.275	TL-208 s
1219.14	609.56	20.	70.	8.263E+03	29.02	1.363	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	267.40	133.66	144.	31.	.004	210.96	1.372s
CE-141	292.03	145.93	90.	25.	.003	104.71	.509s
I-131	567.00	283.44	41.	3.	.000	455.19	.241s
BA-140	610.30	305.14	40.	29.	.003	140.15	.673s
LA-140	657.40	320.69	56.	12.	.001	357.46	1.013
I-131	724.00	361.96	72.	30.	.003	115.70	.243s
BE-7	954.00	476.97	14.	0.	.000	740.33	.111s
LA-140	976.22	400.09	20.	3.	.000	401.05	.064
RU-103	993.01	496.00	30.	17.	.002	137.67	1.119
BA-140	1076.00	537.90	7.	0.	.000	529.15	.000s
CS-134	1209.42	604.70	16.	2.	.000	477.70	1.3600
RU-103	1220.60	610.33	90.	0.	.000	.00	1.3630
RU-106	1241.67	620.83	17.	6.	.001	210.02	.962
I-131	1274.00	637.00	5.	0.	.000	447.21	.000s
CS-137	1324.22	662.11	10.	3.	.000	295.65	.656s
ZR-95	1447.01	723.91	9.	2.	.000	319.44	.435s
ZR-95	1513.62	756.02	11.	2.	.000	415.10	.500s
NE-95	1529.96	764.99	9.	4.	.000	220.00	.530s
CS-134	1509.77	794.90	15.	7.	.001	105.06	1.666
CO-50	1619.25	809.64	11.	3.	.000	415.69	.057s
MN-54	1672.19	836.12	13.	9.	.001	153.46	.556s
FE-59	2194.73	1097.41	4.	12.	.001	02.33	.764s
ZN-65	2232.75	1116.42	4.	7.	.001	117.04	1.206
CO-60	2345.43	1172.77	5.	3.	.000	224.43	.502s
FE-59	2504.67	1292.40	3.	1.	.000	432.05	1.333
CO-60	2663.14	1331.64	3.	1.	.000	346.41	.300s
K-40	2922.01	1461.40	5.	44.	.005	30.09	2.206s
LA-140	3109.00	1594.50	4.	6.	.001	156.35	.417s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA

NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

BE-7	<	1.9573E+01	2.2075E+01
K-40	<	5.7340E+01	5.7340E+01
MN-54	<	2.4299E+00	2.4954E+00
FE-59	<	2.7282E+00	3.2079E+00
CO-58	<	2.0631E+00	2.3198E+00
CO-60	<	2.2989E+00	2.3089E+00
ZN-65	<	2.8132E+00	2.9107E+00
ZR-95	<	4.2476E+00	4.8360E+00
NB-95	<	1.7999E+00	2.2011E+00
RU-103	<	2.9117E+00	3.5977E+00
RU-106	<	2.6086E+01	2.6681E+01
I-131	<	3.4918E+00	9.8353E+00
CS-134	<	1.9543E+00	1.9760E+00
CS-137	<	2.3141E+00	2.3150E+00
BA-140	<	4.9308E+00	9.4543E+00
LA-140	<	2.1464E+00	4.1155E+00
CE-141	<	4.3424E+00	5.6069E+00
CE-144	<	2.3013E+01	2.4510E+01

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	204.30 & I-131	304.04 % BA-140
320.76 % LA-140	364.40 & I-131	477.61 % BE-7	407.02 & LA-140
497.00 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 ! RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.10 % ZR-95
756.72 % ZR-95	765.79 & NB-95	795.04 & CS-134	810.77 & CO-58
834.04 & MN-54	1099.25 & FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.01 % K-40	1596.10 & LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWJ-6752 3.5 LITER
02-NOV-2007 12:00 EG

Spectrum Filename: C:\User\37774.Ani

*Known
CS-137
65.6 pCi/l.
JWC
11-5-07*

Acquisition information

Start time 03-Nov-2007 00:54:45
Live time 8674
Real time 8684
Dead time .11%
Detector/Geometry IDs 3 & 0

Detector system
MCE 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB
Zero offset -.110 keV; Gain .500 keV/channel
Quadratic -.125E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RISØ method

Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background widths best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	02-Nov-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Absorption (internal) NO
 Geometry correction NO
 Random summing NO

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 Environmental Inc Spectrum name: 37774.An1

Energy calibration normalized difference: .2536

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	ENERGY	COUNTS	NET AREA	EFFICIENCY	* AREA	UNCERT	FWHM	SUSPECTED
			COUNTS			2 SIGMA %	keV	NUCLIDE
703.25	351.50	77.	116.	8.992E+03	32.16	1.502	PB-214	s
1210.64	609.31	25.	107.	1.254E+04	23.40	1.362	BI-214	D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY	UNCERT	FWHM
					CTS/SEC	2 SIGMA %	keV
CE-144	267.00	133.42	69.	7.	.001	417.96	.500s
CE-141	290.13	144.90	130.	31.	.004	189.09	.991
I-131	569.00	284.44	45.	7.	.001	245.76	.000s
BA-140	609.10	304.54	60.	25.	.003	171.43	.692s
LA-140	658.97	329.43	49.	30.	.003	128.75	1.575s
I-131	729.92	364.92	39.	40.	.005	89.00	1.286s
BE-7	957.17	470.56	47.	7.	.001	294.02	.494s
LA-140	974.00	406.97	19.	0.	.000	071.70	.000s
RU-103	994.61	497.20	25.	12.	.001	131.23	.567s
BA-140	1073.07	536.52	40.	10.	.002	136.69	1.049
CS-134	1209.42	604.70	36.	9.	.001	190.51	1.360D
RU-103	1220.60	610.33	130.	0.	.000	.00	1.363D
RU-106	1245.00	622.49	13.	0.	.000	.00	.000s
I-131	1275.16	637.50	26.	19.	.002	110.10	.590s
CS-137	1322.62	661.31	59.	529.	.061	10.97	1.511
ZR-95	1449.07	724.54	15.	7.	.001	185.86	.493s
ZR-95	1516.50	750.26	20.	0.	.001	216.02	.750s
NB-95	1532.46	766.24	30.	12.	.001	205.00	.670s
CS-134	1580.33	794.18	10.	6.	.001	258.20	.635s
CO-60	1621.62	810.83	14.	11.	.001	136.03	.562s
MN-54	1668.00	834.02	12.	1.	.000	603.74	.543s
FE-59	2197.00	1090.55	12.	6.	.001	212.36	.627s
ZN-65	2232.57	1116.33	2.	2.	.000	193.70	.504s
CO-60	2347.54	1173.02	5.	7.	.001	137.60	1.252
FE-59	2504.33	1292.23	0.	3.	.000	115.47	.750s
CO-60	2664.60	1332.36	2.	1.	.000	202.04	.700s
K-40	2920.54	1460.34	6.	46.	.005	39.37	1.090s
LA-140	3194.60	1597.38	4.	2.	.000	414.55	.520s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.9785E+01	3.0124E+01	
K-40	<	5.7788E+01	5.7788E+01	
MN-54	<	2.2970E+00	2.3015E+00	
FE-59	<	4.6695E+00	4.7333E+00	
CO-58	<	2.3144E+00	2.3342E+00	
CO-60	<	2.1282E+00	2.1289E+00	
ZN-65	<	1.9417E+00	1.9465E+00	
ZR-95	<	5.2758E+00	5.3258E+00	
NB-95	<	3.2097E+00	3.2655E+00	
RU-103	<	2.4184E+00	2.4559E+00	
RU-106	<	2.3002E+01	2.3041E+01	
I-131	<	2.5813E+00	2.7031E+00	
CS-134	<	2.9543E+00	2.9567E+00	
CS-137		6.8567E+01	6.8570E+01	7.584E+00
BA-140	<	1.1533E+01	1.2092E+01	
LA-140	<	2.0163E+00	2.1141E+00	
CE-141	<	5.1190E+00	5.2150E+00	
CE-144	<	1.7280E+01	1.7316E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 6.8566640E+01 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 6.8570420E+01 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.04 % BA-140
328.76 % LA-140	364.40 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 ! RU-103
621.84 % RU-106	636.97 % I-131	724.18 % ZR-95	756.72 % ZR-95
765.79 % NB-95	795.04 % CS-134	810.77 % CO-58	834.04 % MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1460.01 % K-40	1596.18 % LA-140	

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

- Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.

Sample description
TWW-6753 3.5 LITER
02-NOV-2007 12:00 AM

Sm
11-6-07

Spectrum Filename: C:\User\87731.An1

Acquisition information

Start time 03-Nov-2007 11:40:56
Live time 8000
Real time 8001
Dead time .02%
Detector/Geometry IDs 8 & 0

Detector system
MCB 5 Input 4

Calibration

Filename: D8g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random errors: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	02-Nov-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkgbw.pbc

Absorption (internal) NO
 Geometry correction NO
 Random summing NO

EG&G ORTEC G V - I (175) WAN32 I4W02.96 05-NOV-2007 11:42:19 Page 2
 Environmental Inc Spectrum name: 87731.Anl

Energy calibration normalized difference: .2740

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1210.27	609.22	34.	60. 0.920E+03	34.00	1.793	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.90	133.54	199.	29.	.004	141.90 1.525D
CE-141	290.70	145.44	220.	20.	.004	155.53 1.532D
I-131	566.09	283.53	60.	15.	.002	163.04 1.033s
BA-140	610.48	305.32	04.	21.	.003	157.36 .660s
LA-140	657.00	328.58	37.	1.	.000	1420.48 .000s
I-131	730.08	365.12	70.	36.	.004	107.44 .844s
BE-7	953.15	476.66	40.	17.	.002	159.93 .465s
LA-140	974.00	487.00	12.	1.	.000	721.11 .000s
RU-103	996.43	498.29	33.	21.	.003	113.49 .521s
BA-140	1071.45	535.00	20.	13.	.002	170.33 .550s
CS-134	1209.24	604.70	19.	6.	.001	207.32 1.790D
RU-103	1220.50	610.33	40.	0.	.000	.00 1.265D
RU-106	1242.22	621.19	21.	9.	.001	180.56 .613s
I-131	1273.22	636.69	14.	3.	.000	371.18 .506s
CS-137	1322.15	661.16	20.	447.	.056	10.68 1.831
ZR-95	1449.00	724.59	7.	1.	.000	529.15 .000s
ZR-95	1512.47	756.32	13.	4.	.001	200.34 .596s
NE-95	1534.02	767.50	20.	21.	.003	99.97 .959s
CS-134	1507.00	793.59	12.	5.	.001	256.12 .445s
CO-58	1620.70	810.44	11.	10.	.001	140.67 1.232s
MN-54	1660.39	834.29	0.	10.	.001	126.60 .006s
FE-59	2199.06	1100.05	2.	3.	.000	176.30 .917s
ZN-65	2232.34	1116.30	5.	10.	.001	103.20 .523s
CO-60	2345.00	1172.64	1.	0.	.000	200.00 .167s
FE-59	2583.00	1291.66	0.	2.	.000	651.15 .000s
CO-60	2666.00	1333.16	1.	0.	.000	200.00 .000s
K-40	2920.09	1460.24	2.	34.	.004	36.79 .010s
LA-140	3188.23	1594.34	2.	7.	.001	117.80 .687s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER

BE-7	<	3.3017E+01	3.3443E+01	
K-40	<	6.9840E+01	6.9840E+01	
MN-54	<	2.5200E+00	2.5255E+00	
FE-59	<	3.6173E+00	3.6733E+00	
CO-58	<	2.4815E+00	2.5056E+00	
CO-60	<	1.0651E+00	1.0654E+00	
ZN-65	<	4.0989E+00	4.1104E+00	
ZR-95	<	4.5710E+00	4.6209E+00	
NB-95	<	3.2060E+00	3.3516E+00	
RU-103	<	3.1675E+00	3.2232E+00	
RU-106	<	3.0756E+01	3.0813E+01	
I-131	<	4.3299E+00	4.7153E+00	
CS-134	<	2.6087E+00	2.6111E+00	
CS-137	<	7.0176E+01	7.0180E+01	7.520E+00
BA-140	<	1.1707E+01	1.2352E+01	
LA-140	<	1.9536E+00	2.0612E+00	
CE-141	<	7.8791E+00	8.0466E+00	
CE-144	<	3.3050E+01	3.3130E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 7.0176060E+01 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 7.0180450E+01 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 % CE-141	204.30 % I-131	304.04 % BA-140
328.76 % LA-140	364.40 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	724.10 % ZR-95	756.72 % ZR-95
765.79 % NB-95	795.04 % CS-134	810.77 % CO-58	834.04 % MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1460.01 % K-40	1596.10 % LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- # - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-6754 3.5 LITER
02-OCT-2007 10:23 AMS

Jim
10-29-07

Spectrum Filename: C:\User\47587.Anl

Acquisition information
Start time 12-Oct-2007 13:29:10
Live time 8059
Real time 8070
Dead time .13%
Detector/Geometry IDs 4 & 4

Detector system
MCB 1 Input 4

Calibration
Filename: D4g1.C1b
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB
Zero offset -.130 keV; Gain .500 keV/channel
Quadratic $-.197E-07$ keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05
Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	02-Oct-2007 10:23:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.pbc

10-Aug-2007 10:12:07

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA	FWHM keV	SUSPECTED NUCLIDE
702.03	351.30	115.	103. 1.296E+04	50.56	1.931	PB-214 s
1217.00	608.52	42.	98. 2.036E+04	27.41	1.668	XE-135 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA	FWHM keV
CE-144	269.75	134.70	291.	0.	.001	690.10	.524s
CE-141	200.22	144.02	201.	33.	.004	213.33	.507s
I-131	560.64	204.27	130.	59.	.007	141.77	2.450s
BA-140	611.42	305.66	105.	62.	.008	113.17	.054s
LA-140	656.06	320.39	71.	19.	.002	149.12	1.177
I-131	729.07	364.50	55.	17.	.002	140.34	.084s
BE-7	955.54	477.76	24.	8.	.001	107.00	.467s
LA-140	973.00	486.49	14.	0.	.000	740.33	.003s
RU-103	994.10	497.04	55.	27.	.003	120.73	1.131s
BA-140	1075.00	537.50	13.	0.	.000	721.11	.000s
CS-134	1209.36	604.70	32.	9.	.001	101.05	1.665D
RU-103	1220.62	610.33	110.	12.	.001	261.09	1.669D
RU-106	1241.61	620.03	19.	11.	.001	137.95	1.379
I-131	1272.57	636.31	12.	2.	.000	400.00	.903s
CS-137	1321.09	660.97	29.	15.	.002	150.76	.596s
ZR-95	1444.65	722.36	25.	5.	.001	364.22	.627s
ZR-95	1515.23	757.66	17.	21.	.003	07.00	1.769
NB-95	1529.00	764.55	10.	4.	.000	244.95	.000s
CS-134	1591.65	795.07	6.	2.	.000	316.23	.000s
CO-50	1624.37	812.24	12.	13.	.002	120.16	.527s
MN-54	1660.73	834.42	9.	5.	.001	191.03	.654s
FE-59	2197.00	1090.59	5.	6.	.001	133.33	1.077s
ZN-65	2232.00	1116.10	3.	0.	.000	.00	.000s
CO-60	2347.30	1173.79	2.	7.	.001	102.05	.569s
FE-59	2575.09	1200.06	9.	3.	.000	426.14	.459s
CO-60	2665.25	1332.74	2.	4.	.000	141.42	1.125s
K-40	2920.35	1460.30	6.	37.	.005	44.64	1.694
LA-140	3192.00	1596.13	2.	1.	.000	202.04	.000s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	3.9812E+01	4.4507E+01
K-40	<	1.0600E+02	1.0600E+02
MN-54	<	3.8069E+00	3.8935E+00
FE-59	<	6.2705E+00	7.3419E+00
CO-58	<	4.9394E+00	5.4542E+00
CO-60	<	2.9062E+00	2.9168E+00
ZN-65	<	4.8887E+00	5.0315E+00
ZR-95	<	9.6119E+00	1.0726E+01
NB-95	<	3.6248E+00	4.4285E+00
RU-103	<	6.3609E+00	7.6066E+00
RU-106	<	4.8348E+01	4.9279E+01
I-131	<	5.9807E+00	1.4352E+01
CS-134	<	5.2824E+00	5.3310E+00
CS-137	<	6.7722E+00	6.7765E+00
BA-140	<	1.2707E+01	2.2030E+01
LA-140	<	5.6631E+00	9.8180E+00
CE-141	<	9.3952E+00	1.1661E+01
CE-144	<	4.8599E+01	4.9811E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 & CE-141	284.30 * I-131	304.84 & BA-140
328.76 * LA-140	364.48 * I-131	477.61 * BE-7	487.02 * LA-140
497.00 * RU-103	537.32 * BA-140	604.70 * CS-134	610.33 * RU-103
621.84 & RU-106	636.97 * I-131	661.66 * CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 & NB-95	795.84 * CS-134	810.77 & CO-58
834.84 * MN-54	1099.25 * FE-59	1115.55 * ZN-65	1173.24 * CO-60
1291.60 & FE-59	1332.50 * CO-60	1460.81 * K-40	1596.18 * LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- * - Peak fails sensitivity test.
- # - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-6755 3.5 LITER
02-OCT-2007 11:49 AMS

Swc
10-29-07

Spectrum Filename: C:\User\17702.An1

Acquisition information
Start time 13-Oct-2007 09:43:22
Live time 7355
Real time 7365
Dead time .13%
Detector/Geometry IDs 1 & 0

Detector system
MCB 1 Input 1

Calibration
Filename: dig1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:50
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.988 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 50.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit methods:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	02-Oct-2007 11:49:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc
		10-Aug-2007 10:08:43
Absorption (Internal)	NO	

EG&G ORTEC G V - I (175) WAN32 I4W02.96 13-OCT-2007 11:46:04 Page 2
 Environmental Inc Spectrum name: 17702.Anl

Energy calibration normalized difference: .0009

```

***** UNIDENTIFIED PEAK SUMMARY *****
PEAK CENTROID BACKGROUND NET AREA EFFICIENCY UNCERT FWHM SUSPECTED
CHANNEL ENERGY COUNTS COUNTS * AREA 2 SIGMA % keV NUCLIDE
-----
706.10 351.70 100. 112. 8.986E+03 41.65 1.305 PB-214
1023.23 510.62 05. 156. 1.607E+04 32.37 1.624 TL-208 s
1220.19 609.29 35. 131. 1.523E+04 26.71 2.305 BI-214 s
  
```

s Peak fails shape tests.
 D Peak area deconvoluted.

```

***** IDENTIFIED PEAK SUMMARY *****
NUCLIDE PEAK CENTROID BACKGROUND NET AREA INTENSITY UNCERT FWHM
CHANNEL ENERGY COUNTS COUNTS CTS/SEC 2 SIGMA % keV
-----
CE-144 272.07 134.31 136. 10. .001 302.56 .453s
CE-141 291.22 143.91 257. 14. .002 414.55 .866s
I-131 565.00 201.06 107. 8. .001 482.22 .000s
BA-140 608.00 302.60 90. 1. .000 3070.29 .000s
LA-140 660.00 328.65 31. 0. .000 1113.55 .334s
I-131 730.12 363.78 67. 9. .001 326.08 .967s
BE-7 953.84 475.86 52. 24. .003 126.93 .090s
LA-140 976.00 486.96 14. 0. .000 740.33 .195s
RU-103 994.65 496.30 62. 14. .002 231.23 1.290
BA-140 1074.35 536.23 24. 20. .004 76.33 1.406
CS-134 1211.03 604.70 25. 0. .000 .00 1.845
RU-103 1222.27 610.33 157. 0. .000 .00 1.840
RU-106 1244.35 621.39 20. 14. .002 128.31 1.273s
I-131 1275.00 636.75 9. 0. .000 600.00 .000s
CS-137 1323.46 661.03 22. 20. .003 100.33 .753s
ZR-95 1440.00 723.42 12. 0. .000 .00 .000s
ZR-95 1513.59 756.20 11. 14. .002 99.30 .511s
NB-95 1533.50 766.25 17. 12. .002 133.61 .523s
CS-134 1591.09 795.10 6. 2. .000 352.77 .270s
CO-58 1621.00 810.09 9. 2. .000 451.26 .000s
MN-54 1668.42 833.85 16. 13. .002 135.00 .470s
FE-59 2198.97 1099.65 7. 13. .002 102.03 .566s
ZN-65 2229.46 1114.92 4. 2. .000 316.23 .402s
CO-60 2345.29 1172.95 4. 16. .002 74.92 .807s
FE-59 2503.67 1292.30 3. 3. .000 200.00 .835s
CO-60 2664.27 1332.77 0. 0. .001 146.06 2.091
K-40 2919.04 1460.81 0. 52. .007 36.64 2.025
LA-140 3190.00 1596.17 1. 1. .000 200.00 .200s
  
```

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	COUNT TIME CORRECTED	UNCERTAINTY	2 SIGMA
ACTIVITY	ACTIVITY	COUNTING		
pCi/LITER	pCi/LITER	pCi/LITER		
BE-7	<	3.5033E+01	4.0377E+01	
K-40	<	8.5094E+01	8.5094E+01	
MN-54	<	3.0676E+00	3.1428E+00	
FE-59	<	4.8705E+00	5.7727E+00	
CO-58	<	2.1989E+00	2.4467E+00	
CO-60	<	3.3073E+00	3.3203E+00	
ZN-65	<	3.4338E+00	3.5420E+00	
ZR-95	<	4.8398E+00	5.4468E+00	
NB-95	<	3.2091E+00	3.9818E+00	
RU-103	<	4.3048E+00	5.2194E+00	
RU-106	<	3.0163E+01	3.0789E+01	
I-131	<	4.2048E+00	1.0797E+01	
CS-134	<	2.8923E+00	2.9214E+00	
CS-137	<	3.6513E+00	3.6538E+00	
BA-140	<	1.1319E+01	2.0477E+01	
LA-140	<	3.0560E+00	5.5284E+00	
CE-141	<	9.0213E+00	1.1385E+01	
CE-144	<	2.9679E+01	3.0477E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	284.30 & I-131	304.84 & BA-140
328.76 % LA-140	364.48 % I-131	477.61 & BE-7	487.02 % LA-140
497.08 % RU-103	537.32 & BA-140	610.33 RU-103	621.84 % RU-106
636.97 % I-131	661.66 % CS-137	724.18 % ZR-95	756.72 % ZR-95
765.79 % NB-95	795.84 % CS-134	810.77 % CO-58	834.84 & MN-54
1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TW-6756 3.5 LITER
02-OCT-2007 14:20 AMS

Sum
10-24-07

Spectrum Filename: C:\User\17703.Anl

Acquisition information

Start time 13-Oct-2007 11:48:19
Live time 7425
Real time 7435
Dead time .14%
Detector/Geometry IDs 1 & 0

Detector system
MCB 1 Input 1

Calibration

Filename: dig1.Clb
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05
Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	02-Oct-2007 14:20:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

10-Aug-2007 10:08:43

Energy calibration normalized difference: .0045

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
190.01	93.21	664.	206.	1.708E+04	49.80	1.750	PB-214 s
421.28	209.06	514.	164.	9.480E+03	57.46	1.643	AC-228
479.17	238.06	381.	135.	8.386E+03	58.15	1.741	PB-212 s
543.27	270.17	262.	130.	8.802E+03	48.59	1.242	AC-228
657.27	327.28	268.	114.	8.690E+03	44.91	1.722	AC-228 D
678.73	338.04	303.	418.	3.267E+04	22.63	1.668	AC-228
705.42	351.40	243.	242.	1.943E+04	32.35	1.996	PB-214 s
928.09	462.96	178.	118.	1.132E+04	53.96	1.649	AC-228 s
1219.60	608.99	103.	136.	1.505E+04	27.10	1.847	BI-214 D
1590.16	794.64	72.	84.	1.170E+04	36.16	1.933	AC-228 D
1822.56	911.07	63.	494.	7.616E+04	12.38	1.962	AC-228
1928.77	964.28	62.	94.	1.503E+04	31.58	2.014	EU-152 D
1938.29	969.05	57.	276.	4.444E+04	14.32	2.016	AC-228 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	270.53	133.54	657.	52.	.007	142.81	1.640D
CE-141	293.00	144.00	162.	2.	.000	1702.29	.159s
I-131	571.00	284.07	94.	3.	.000	755.23	.000s
BA-140	616.29	306.76	242.	14.	.002	428.89	.486s
LA-140	660.22	328.76	274.	41.	.006	110.82	1.723D
I-131	732.39	364.92	52.	4.	.001	428.17	.376s
BE-7	954.93	476.40	81.	14.	.002	210.21	.728s
LA-140	974.40	486.16	45.	20.	.003	184.88	.980s
RU-103	992.23	495.09	138.	38.	.005	143.60	.570s
BA-140	1074.93	536.52	54.	15.	.002	147.87	1.047s
CS-134	1211.03	604.70	54.	4.	.000	602.30	1.845D
RU-103	1222.27	610.33	204.	18.	.002	224.13	1.848D
RU-106	1244.27	621.35	39.	2.	.000	893.69	.589s
I-131	1275.33	636.92	69.	9.	.001	326.60	.502s
CS-137	1327.76	663.18	68.	21.	.003	155.23	1.352
ZR-95	1448.39	723.61	23.	3.	.000	347.56	.540s
ZR-95	1518.32	758.65	57.	8.	.001	337.05	.640s
NB-95	1532.50	765.75	21.	1.	.000	1079.09	.835s
CS-134	1592.57	795.84	150.	10.	.001	339.07	1.934D
CO-58	1626.06	812.62	30.	3.	.000	642.75	.440s
MN-54	1672.01	835.65	88.	40.	.005	112.84	1.611s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	2199.96	1100.15	20.	9.	.001	162.46	.651s
ZN-65	2228.93	1114.66	46.	11.	.001	274.49	.416s
CO-60	2342.67	1171.64	16.	5.	.001	280.31	.653s
FE-59	2580.18	1290.64	7.	1.	.000	479.58	.322s
CO-60	2658.64	1329.95	11.	16.	.002	98.28	.483s
K-40	2919.82	1460.80	15.	815.	.110	7.45	2.052
LA-140	3191.50	1596.92	3.	2.	.000	282.84	.738s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED	UNCERTAINTY	2 SIGMA
	ACTIVITY	ACTIVITY	COUNTING	
	pCi/LITER	pCi/LITER	pCi/LITER	
BE-7	< 4.2563E+01	4.9044E+01		
K-40	1.5854E+03	1.5854E+03	1.286E+02	
MN-54	< 6.6794E+00	6.8430E+00		
FE-59	< 7.3469E+00	8.7054E+00		
CO-58	< 3.8523E+00	4.2858E+00		
CO-60	< 3.7390E+00	3.7537E+00		
ZN-65	< 1.1473E+01	1.1833E+01		
ZR-95	< 9.3592E+00	1.0531E+01		
NB-95	< 3.4884E+00	4.3268E+00		
RU-103	< 6.3241E+00	7.6654E+00		
RU-106	< 3.9290E+01	4.0104E+01		
I-131	< 3.7186E+00	9.5337E+00		
CS-134	< 4.2295E+00	4.2721E+00		
CS-137	< 5.9607E+00	5.9648E+00		
BA-140	< 1.6149E+01	2.9185E+01		
LA-140	< 3.5639E+00	6.4408E+00		
CE-141	< 7.1578E+00	9.0301E+00		
CE-144	< 6.4061E+01	6.5781E+01		

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 1.5853520E+03 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 1.5853520E+03 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.00 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60

1291.60 * FE-59 1332.50 & CO-60 1596.18 * LA-140
1291.60 * FE-59 1332.50 & CO-60 1596.18 * LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
 - ? - Peak is too narrow.
 - @ - Peak is too wide at FW25M, but ok at FWHM.
 - * - Peak fails sensitivity test.
 - \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
 - + - Peak activity higher than counting uncertainty range.
 - - Peak activity lower than counting uncertainty range.
 - = - Peak outside analysis energy range.
 - & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
 - P - Peakbackground subtraction
-

Sample description
TWW-6757 3.5 LITER
02-OCT-2007 14:30 AMS

Smc
10-29-07

Spectrum Filename: C:\User\17700.Anl

Acquisition information

Start time 12-Oct-2007 14:31:32
Live time 7787
Real time 7796
Dead time .12%
Detector/Geometry IDs 1 & 0

Detector system
MCE 1 Input 1

Calibration

Filename: dig1.C1b
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.988 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	02-Oct-2007 14:30:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

10-Aug-2007 10:08:43

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
705.00	351.59	121.	79. 6.336E+03	57.00	2.061	PB-214
1219.83	609.11	44.	89. 1.030E+04	30.05	1.847	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	271.67	134.11	182.	10.	.001	416.97 .377s
CE-141	291.30	143.95	227.	26.	.003	200.25 .544s
I-131	572.92	285.03	69.	8.	.001	302.08 .467s
BA-140	614.30	305.76	145.	49.	.006	106.63 1.041s
LA-140	661.30	329.34	50.	8.	.001	270.39 .910s
I-131	730.06	363.75	24.	2.	.000	666.67 .267s
BE-7	953.10	475.40	68.	28.	.004	130.95 .951s
LA-140	974.33	486.12	32.	9.	.001	215.03 .455s
RU-103	996.23	497.09	16.	2.	.000	493.27 .594s
BA-140	1075.03	536.97	15.	2.	.000	564.27 1.002s
CS-134	1211.03	604.70	39.	10.	.001	104.27 1.845D
RU-103	1222.27	610.33	126.	1.	.000	5404.04 1.848D
RU-106	1246.00	622.22	8.	1.	.000	565.69 .000s
I-131	1275.35	636.92	20.	20.	.003	114.09 .557s
CS-137	1324.90	661.75	13.	4.	.000	201.88 .473s
ZR-95	1446.97	722.90	24.	9.	.001	214.39 .982s
ZR-95	1513.92	756.44	7.	1.	.000	479.58 .423s
NE-95	1534.00	766.50	14.	3.	.000	362.99 .000s
CS-134	1593.56	796.34	13.	3.	.000	363.42 1.632
CO-58	1619.49	809.33	14.	25.	.003	76.04 .922s
MN-54	1671.83	835.56	18.	20.	.003	106.09 1.330s
FE-59	2190.17	1099.25	3.	1.	.000	452.16 .450s
ZN-65	2231.00	1115.70	2.	2.	.000	200.00 .000s
CO-60	2347.10	1173.86	13.	19.	.002	101.52 .675s
FE-59	2575.00	1288.04	11.	5.	.001	279.44 1.006s
CO-60	2667.20	1334.23	0.	9.	.001	66.67 .501s
K-40	2919.55	1460.67	9.	71.	.009	31.49 .729s
LA-140	3189.00	1595.67	0.	0.	.000	.00 .000s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	3.7419E+01	4.2618E+01
K-40	<	8.3266E+01	8.3266E+01
MN-54	<	3.0232E+00	3.0911E+00
FE-59	<	3.8729E+00	4.5256E+00
CO-58	<	2.5356E+00	2.7964E+00
CO-60	<	1.8369E+00	1.8435E+00
ZN-65	<	2.2936E+00	2.3597E+00
ZR-95	<	4.0585E+00	4.5227E+00
NB-95	<	2.8893E+00	3.5209E+00
RU-103	<	2.1036E+00	2.5098E+00
RU-106	<	2.0942E+01	2.1340E+01
I-131	<	2.5270E+00	5.9973E+00
CS-134	<	3.4048E+00	3.4363E+00
CS-137	<	2.7916E+00	2.7934E+00
BA-140	<	8.9888E+00	1.5476E+01
LA-140	<	2.8559E+00	4.9169E+00
CE-141	<	8.0326E+00	9.9424E+00
CE-144	<	3.2370E+01	3.3167E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 & CE-141	204.30 % I-131	304.84 & BA-140
328.76 % LA-140	364.48 % I-131	477.61 & BE-7	487.02 & LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 & ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 & FE-59	1332.50 & CO-60	1460.81 % K-40	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- x - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-6758 3.5 LITER
02-OCT-2007 12:00 BG

Sp
10-27-07

Spectrum Filename: C:\User\47568.Ani

Acquisition information
Start time 06-Oct-2007 11:40:03
Live time 11359
Real time 11372
Dead time .12%
Detector/Geometry IDs 4 & 4

Detector system
MCB 1 Input 4

Calibration
Filename: D4q1.C1b
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB

Zero offset -.130 keV; Gain .500 keV/channel
Quadratic $-.197E-07$ keV/channel²

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	02-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg4w.pbc
		10-Aug-2007 10:12:07
Absorption (Internal)	NO	
Geometry correction	NO	

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY % AREA	UNCERT 2 SIGMA	FWHM % keV	SUSPECTED NUCLIDE
476.68	238.27	376.	174.	1.542E+04	45.24	.740	PB-212 s
676.59	338.25	217.	182.	2.210E+04	37.98	1.253	AC-228 s
703.67	351.80	186.	99.	1.247E+04	58.66	1.358	PB-214
1218.58	609.31	81.	65.	1.342E+04	46.58	1.669	BI-214 D
1589.32	794.71	40.	44.	1.146E+04	51.02	1.822	AC-228 D
1823.15	911.64	23.	147.	4.335E+04	21.80	1.965	AC-228 s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	270.18	135.00	448.	79.	.007	153.22	1.750s
CE-141	293.00	146.41	486.	74.	.007	180.25	1.085s
I-131	572.15	286.02	182.	9.	.001	462.77	.504s
BA-140	609.00	304.45	50.	0.	.000	1414.21	.000s
LA-140	657.61	328.76	190.	2.	.000	1726.19	1.435D
I-131	727.81	363.87	97.	10.	.001	302.28	.426s
BE-7	960.00	479.99	51.	6.	.000	395.30	.000s
LA-140	973.89	486.94	86.	23.	.002	161.22	1.481
RU-103	996.01	498.00	98.	42.	.004	99.20	.800s
BA-140	1075.49	537.75	38.	9.	.001	204.88	.757s
CS-134	1209.36	604.70	72.	6.	.001	481.18	1.665D
RU-103	1220.62	610.33	145.	4.	.000	972.43	1.669D
RU-106	1245.01	622.52	62.	19.	.002	172.00	1.030s
I-131	1274.00	637.02	19.	2.	.000	628.65	.000s
CS-137	1321.45	660.75	52.	11.	.001	239.09	.376s
ZR-95	1444.56	722.32	26.	10.	.001	162.19	.415s
ZR-95	1511.47	755.78	44.	31.	.003	100.52	1.190s
NB-95	1530.45	765.27	10.	1.	.000	632.46	.577s
CS-134	1591.59	795.84	71.	8.	.001	298.72	1.823D
CO-58	1621.00	810.55	16.	0.	.000	.00	.000s
MN-54	1670.67	835.39	43.	26.	.002	121.02	1.550
FE-59	2198.00	1099.09	10.	3.	.000	319.72	.174s
ZN-65	2226.33	1113.26	12.	4.	.000	300.00	.703s
CO-60	2347.13	1173.67	18.	10.	.001	181.11	1.298s
FE-59	2581.85	1291.04	0.	12.	.001	107.67	1.033s
CO-60	2658.60	1329.42	18.	4.	.000	435.89	.723s
K-40	2922.42	1461.33	23.	251.	.022	16.47	2.564s
LA-140	3191.60	1595.93	2.	1.	.000	282.84	.700s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA

NUCLIDE	ACTIVITY	ACTIVITY	COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER

BE-7	<	3.9187E+01	4.1272E+01	
K-40	#	5.9943E+02	5.9943E+02	1.166E+02
MN-54	<	5.7225E+00	5.7733E+00	
FE-59	<	6.2561E+00	6.6567E+00	
CO-58	<	4.0810E+00	4.2434E+00	
CO-60	<	5.6066E+00	5.6147E+00	
ZN-65	<	7.5997E+00	7.6863E+00	
ZR-95	<	1.0440E+01	1.0901E+01	
NB-95	<	2.5200E+00	2.7275E+00	
RU-103	<	6.0067E+00	6.4447E+00	
RU-106	<	5.7562E+01	5.7996E+01	
I-131	<	5.5261E+00	7.7987E+00	
CS-134	<	5.6546E+00	5.6753E+00	
CS-137	<	6.2953E+00	6.2969E+00	
BA-140	<	1.5153E+01	1.8817E+01	
LA-140	<	4.6234E+00	5.7411E+00	
CE-141	<	1.0254E+01	1.1163E+01	
CE-144	<	4.2815E+01	4.3232E+01	

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

***** SUMMARY *****
 TOTAL ACTIVITY (59.9 to 2024.1 keV) 5.9943490E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 5.9943490E+02 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 & CE-144	145.44 & CE-141	284.30 & I-131	304.84 * BA-140
328.76 * LA-140	364.48 * I-131	477.61 & BE-7	487.02 * LA-140
497.08 & RU-103	537.32 * BA-140	604.70 * CS-134	610.33 * RU-103
621.84 * RU-106	636.97 * I-131	661.66 & CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 * NB-95	795.84 * CS-134	810.77 * CO-58
834.84 * MN-54	1099.25 * FE-59	1115.55 & ZN-65	1173.24 * CO-60
1291.60 * FE-59	1332.50 & CO-60	1596.18 * LA-140	

! - Peak is part of a multiplet and this area went

Sample description

TW-6759 3.5 LITER
25-SEP-2007 11:06 AMS

SW
10-17-07

Spectrum Filename: C:\User\37709.An1

Acquisition information

Start time 11-Oct-2007 11:05:17
Live time 7338
Real time 7349
Dead time .15%
Detector/Geometry IDs 3 & 0

Detector system

MCR 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY # 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic $-.125E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random errors: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	25-Sep-2007 11:06:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

10-Aug-2007 10:00:17

Energy calibration normalized difference: .1793

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
476.39	238.13	112.	81. 4.762E+03	42.94	1.131	PB-212 D
589.67	294.78	88.	67. 4.548E+03	57.01	1.174	PB-214 s
702.96	351.43	62.	107. 8.354E+03	32.96	1.191	PB-214
1217.70	608.84	40.	93. 1.096E+04	28.14	1.362	BI-214 D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	266.61	133.22	215.	67.	.009	140.13 .672s
CE-141	290.67	145.25	68.	5.	.001	665.73 .750
I-131	568.00	283.94	22.	0.	.000	938.00 .000s
BA-140	609.73	304.01	43.	2.	.000	1133.99 .877
LA-140	658.46	329.18	46.	1.	.000	1509.69 .405s
I-131	729.74	364.83	42.	6.	.001	339.93 .682s
BE-7	955.11	477.53	48.	10.	.001	270.38 .419s
LA-140	974.64	487.29	48.	7.	.001	351.09 1.222
RU-103	994.33	497.14	22.	3.	.000	457.04 .649s
BA-140	1073.39	536.68	30.	9.	.001	221.11 .532s
CS-134	1209.42	604.70	24.	8.	.001	183.42 1.360D
RU-103	1220.68	610.33	119.	7.	.001	421.36 1.363D
RU-106	1242.50	621.24	8.	0.	.000	565.69 .583s
I-131	1269.36	634.68	17.	3.	.000	524.40 .394s
CS-137	1323.00	661.50	6.	0.	.000	489.90 .000s
ZR-95	1448.00	724.01	3.	0.	.000	346.41 .000s
ZR-95	1511.43	755.73	12.	7.	.001	178.43 .943s
NB-95	1531.55	765.78	8.	4.	.000	228.54 .556s
CS-134	1593.00	796.52	3.	0.	.000	346.41 .000s
CO-58	1621.29	810.66	15.	12.	.002	131.23 .645s
MN-54	1670.00	835.02	13.	2.	.000	523.00 .836s
FE-59	2197.00	1098.55	0.	0.	.000	.00 .000s
ZN-65	2229.17	1114.63	5.	2.	.000	346.41 .461s
CO-60	2345.71	1172.91	3.	7.	.001	114.29 .950s
FE-59	2584.00	1292.06	1.	0.	.000	200.00 .000s
CO-60	2663.60	1331.06	2.	1.	.000	282.84 .700s
K-40	2920.82	1460.48	7.	89.	.012	24.79 1.698
LA-140	3192.20	1596.18	3.	6.	.001	144.57 .417s

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	3.5206E+01	4.3352E+01	
K-40		1.2647E+02	1.2647E+02	4.895E+01
MN-54	<	2.7933E+00	2.8943E+00	
FE-59	<	1.5836E+00	2.0317E+00	
CO-58	<	2.8571E+00	3.3414E+00	
CO-60	<	2.3661E+00	2.3797E+00	
ZN-65	<	3.9754E+00	4.1603E+00	
ZR-95	<	5.0560E+00	6.0122E+00	
NB-95	<	2.0250E+00	2.7785E+00	
RU-103	<	2.6765E+00	3.5502E+00	
RU-106	<	2.4050E+01	2.4785E+01	
I-131	<	3.1737E+00	1.2640E+01	
CS-134	<	2.8593E+00	2.9017E+00	<
CS-137	<	2.2502E+00	2.2525E+00	<
BA-140	<	1.1813E+01	2.0172E+01	
LA-140	<	2.3176E+00	5.5270E+00	<
CE-141	<	4.3163E+00	6.0716E+00	
CE-144	<	3.3761E+01	3.5100E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

----- SUMMARY -----
 TOTAL ACTIVITY (59.9 to 2024.1 keV) 1.2646840E+02 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 1.2646840E+02 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1115.55 % ZN-65	1173.24 % CO-60	1291.60 % FE-59
1332.50 % CO-60	1596.18 % LA-140		

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- x - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-6760 3.5 LITER
25-SEP-2007 12:00 AMS

Spectrum Filename: C:\User\57500.Ani

Jan
10-17-07

Acquisition information

Start time 09-Oct-2007 08:45:36
Live time 13001
Real time 13005
Dead time .03%
Detector/Geometry IDs 5 & 0

Detector system
MCB 5 Input 1

Calibration

Filename: D5g1.C1b
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB

Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4048 for an energy of 2031.42keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	25-Sep-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc

Absorption (Internal) NO 10-Aug-2007 09:55:42

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1217.48	609.08	24.	50.	1.253E+04	39.28	1.795	BI-214 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	256.85	133.38	90.	20.	.002	216.79	1.562
CE-141	280.81	145.20	216.	47.	.004	128.44	1.042s
I-131	562.42	284.32	112.	23.	.002	188.72	.520s
BA-140	605.03	305.39	65.	14.	.001	200.59	.481s
LA-140	652.05	328.65	29.	2.	.000	545.86	.531s
I-131	724.00	364.27	19.	0.	.000	871.78	.000s
BE-7	953.37	477.94	33.	12.	.001	175.59	.615s
LA-140	971.69	487.03	25.	10.	.001	171.89	.595s
RU-103	992.00	497.11	21.	2.	.000	568.64	.000s
BA-140	1074.39	538.00	17.	11.	.001	141.42	.524s
CS-134	1208.66	604.70	24.	15.	.001	106.27	1.791D
RU-103	1219.99	610.33	22.	0.	.000	.00	.537D
RU-106	1243.00	621.77	13.	3.	.000	374.17	.746s
I-131	1272.50	636.43	2.	0.	.000	282.84	.580s
CS-137	1323.75	661.92	15.	8.	.001	154.11	.465s
ZR-95	1451.54	725.52	12.	13.	.001	103.20	2.222
ZR-95	1515.22	757.24	15.	21.	.002	81.25	1.979
NE-95	1533.88	766.54	15.	10.	.001	148.32	.886s
CS-134	1592.67	795.84	4.	1.	.000	447.21	.872s
CO-58	1625.57	812.24	12.	9.	.001	149.07	.624s
MN-54	1671.89	835.34	13.	17.	.001	108.75	2.066
FE-59	2202.00	1100.30	5.	1.	.000	611.01	.000s
ZN-65	2229.55	1114.10	13.	18.	.001	108.30	.487s
CO-60	2347.45	1173.19	6.	10.	.001	114.67	.721s
FE-59	2584.00	1291.90	2.	1.	.000	282.84	.000s
CO-60	2665.40	1332.80	3.	2.	.000	317.40	.378s
K-40	2922.90	1462.36	12.	35.	.003	65.40	2.947s
LA-140	3187.00	1595.50	0.	0.	.000	.00	.000s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	3.3066E+01	3.9601E+01	
K-40	<	7.4286E+01	7.4286E+01	
MN-54	<	3.7939E+00	3.9126E+00	
FE-59	<	4.5201E+00	5.6094E+00	
CO-58	<	3.3751E+00	3.8656E+00	
CO-60	<	3.5494E+00	3.5672E+00	
ZN-65	<	8.0883E+00	8.4134E+00	
ZR-95	<	6.7548E+00	7.8488E+00	
NB-95	<	3.9751E+00	5.2287E+00	
RU-103	<	3.2089E+00	4.0990E+00	
RU-106	<	3.2754E+01	3.3620E+01	
I-131	<	2.7129E+00	8.9907E+00	
CS-134	<	3.5141E+00	3.5592E+00	
CS-137	<	3.5390E+00	3.5421E+00	
BA-140	<	1.0567E+01	2.2441E+01	
LA-140	<	3.9256E+00	8.3370E+00	
CE-141	<	7.6566E+00	1.0291E+01	
CE-144	<	2.3053E+01	2.3844E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

----- S U M M A R Y -----
 TOTAL ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 % LA-140
497.00 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 ? RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.10 & ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.01 & K-40	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-6761 3.5 LITER
25-SEP-2007 15:21 AMS

Spectrum Filename: C:\User\17693.An1

See
10-17-07

Acquisition information
Start time 11-Oct-2007 10:52:21
Live time 7701
Real time 7714
Dead time .17%
Detector/Geometry IDs 1 & 0

Detector system
MCE 1 Input 1

Calibration
Filename: d1g1.Clb
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:50
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel^2

Library Files
Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters
Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:
RIS0 method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections	Status	Comments
Decay correct to date	YES	25-Sep-2007 15:21:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc
Absorption (Internal)	NO	10-Aug-2007 10:00:43

Energy calibration normalized difference: .0531

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1023.65	510.83	98.	138.	1.420E+04	39.99	1.774	TL-208 s
1219.90	609.15	44.	69.	7.978E+03	36.55	1.847	BI-214 D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	269.25	132.90	297.	56.	.007	120.85	.722s
CE-141	296.36	146.48	243.	29.	.004	109.87	.612s
I-131	568.92	283.02	88.	24.	.003	134.03	.908s
BA-140	612.32	304.76	83.	13.	.002	229.35	.560s
LA-140	662.12	329.71	107.	14.	.002	268.36	.505s
I-131	733.88	365.66	53.	11.	.001	231.84	.861s
BE-7	957.20	477.54	54.	30.	.004	109.04	.990s
LA-140	980.08	489.00	70.	21.	.003	165.23	.925s
RU-103	995.00	496.48	16.	1.	.000	824.62	.167s
BA-140	1077.25	537.68	13.	1.	.000	640.31	.403s
CS-134	1211.03	604.70	31.	6.	.001	287.13	1.845D
RU-103	1222.27	610.33	110.	0.	.000	.00	1.848D
RU-106	1244.01	621.22	39.	10.	.002	143.96	.867s
I-131	1277.85	638.18	15.	20.	.003	80.62	1.086s
CS-137	1324.50	661.55	5.	0.	.000	447.21	.584s
ZR-95	1450.00	724.42	22.	8.	.001	215.41	.000s
ZR-95	1512.35	755.65	18.	4.	.000	380.48	.758s
NB-95	1535.13	767.07	22.	13.	.002	148.89	.803s
CS-134	1592.50	795.81	5.	0.	.000	447.21	.585s
CO-58	1623.40	811.29	15.	13.	.002	122.88	.588s
MN-54	1669.50	834.39	8.	1.	.000	763.03	.768s
FE-59	2197.00	1098.66	3.	0.	.000	346.41	.125s
ZN-65	2230.70	1115.55	10.	5.	.001	206.23	2.080D
CO-60	2340.13	1170.37	12.	4.	.001	316.23	.460s
FE-59	2582.76	1291.93	9.	15.	.002	109.19	1.356s
CO-60	2661.50	1331.38	6.	12.	.002	108.11	.557s
K-40	2919.60	1460.69	15.	80.	.010	34.13	2.243
LA-140	3192.00	1597.17	6.	19.	.002	78.07	1.503s

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED ACTIVITY	UNCERTAINTY	2 SIGMA COUNTING
		pCi/LITER	pCi/LITER	pCi/LITER
BE-7	<	3.4158E+01	4.1960E+01	
K-40	<	8.6775E+01	8.6775E+01	
MN-54	<	2.2679E+00	2.3490E+00	
FE-59	<	3.8122E+00	4.8767E+00	
CO-58	<	2.6201E+00	3.0587E+00	
CO-60	<	2.9136E+00	2.9302E+00	
ZN-65	<	5.2212E+00	5.4612E+00	
ZR-95	<	5.5522E+00	6.5890E+00	
NB-95	<	3.4170E+00	4.6722E+00	
RU-103	<	2.1368E+00	2.8250E+00	
RU-106	<	3.7704E+01	3.8043E+01	
I-131	<	3.6334E+00	1.4250E+01	
CS-134	<	3.0578E+00	3.1026E+00	
CS-137	<	2.1287E+00	2.1308E+00	
BA-140	<	8.4450E+00	1.9937E+01	
LA-140	<	3.9947E+00	9.4309E+00	
CE-141	<	8.4004E+00	1.1770E+01	
CE-144	<	4.1656E+01	4.3289E+01	

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (50.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (50.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	284.30 & I-131	304.84 % BA-140
328.76 & LA-140	364.48 & I-131	477.61 % BE-7	487.02 & LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 ! RU-103
621.84 % RU-106	636.97 & I-131	661.66 % CS-137	724.18 % ZR-95
756.72 & ZR-95	765.79 & NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 & CO-60
1291.60 % FE-59	1332.50 & CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- # - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-6762 3.5 LITER
25-SEP-2007 15:21 AMS

See
10-17-07

Spectrum Filename: C:\User\37710.Ani

Acquisition information

Start time 11-Oct-2007 13:09:50
Live time 8896
Real time 8908
Dead time .13%
Detector/Geometry IDs 3 & 0

Detector system
MCB 1 Input 3

Calibration

Filename: D3g1.C1b
Created: 14-Mar-2007 14:21:31 & 14-Mar-2007 14:50:43
MG #23 GEOMETRY N 1
3.5 Liter in MB

Zero offset -.110 keV; Gain .500 keV/channel
Quadratic -.125E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.90keV
Stop channel 4048 for an energy of 2024.09keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	25-Sep-2007 15:21:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg3w.pbc

Absorption (Internal) NO 10-Aug-2007 10:00:17

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
370.38	105.12	150.	110.	5.583E+03	43.03	1.341	U-235 sM
702.81	351.36	77.	78.	6.031E+03	45.22	1.677	PR-214 s
1021.23	510.59	98.	177.	1.817E+04	29.20	1.390	TL-208 s
1217.98	608.98	28.	55.	6.441E+03	38.43	1.362	BI-214 D
2919.36	1459.75	11.	44.	9.782E+03	49.73	1.087	AC-228 s

s Peak fails shape tests.
 D Peak area deconvoluted.
 M Peak is close to a library peak.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	267.06	133.44	151.	57.	.006	117.94	.810s
CE-141	293.84	146.84	151.	32.	.004	209.14	.722s
I-131	569.08	284.48	53.	20.	.002	172.23	.619s
BA-140	611.61	305.75	54.	11.	.001	198.34	.634s
LA-140	658.00	328.95	26.	0.	.000	1019.80	.000s
I-131	728.00	363.96	34.	0.	.000	.00	.000s
BE-7	961.00	480.47	41.	7.	.001	202.46	.000s
LA-140	972.84	486.39	33.	5.	.001	414.53	.486s
RU-103	996.00	497.98	12.	2.	.000	480.74	.000s
BA-140	1073.00	536.48	10.	2.	.000	346.41	.225s
CS-134	1209.42	604.70	26.	11.	.001	146.54	1.360D
RU-103	1220.68	610.33	28.	0.	.000	.00	.206D
RU-106	1244.00	621.99	9.	1.	.000	538.52	.000s
I-131	1272.00	636.00	7.	2.	.000	405.96	.000s
CS-137	1322.00	661.00	7.	0.	.000	529.15	.222s
ZR-95	1446.00	723.01	19.	4.	.000	319.39	.000s
ZR-95	1509.95	754.98	11.	6.	.001	186.23	1.520
NB-95	1532.75	766.39	16.	16.	.002	111.80	.945s
CS-134	1591.68	795.82	5.	1.	.000	447.21	.700s
CO-58	1621.00	810.52	8.	3.	.000	328.86	.000s
MN-54	1667.93	833.99	6.	5.	.001	164.92	.733s
FE-59	2200.29	1100.19	9.	7.	.001	166.60	.723s
ZN-65	2233.25	1116.67	3.	3.	.000	215.06	.475s
CO-60	2346.00	1173.05	4.	0.	.000	400.00	.000s
FE-59	2583.41	1291.77	4.	5.	.001	158.32	.429s
CO-60	2664.50	1332.31	2.	0.	.000	282.84	.583s
K-40	2921.48	1468.81	45.	0.	.000	.00	1.822
LA-140	3191.00	1595.58	2.	0.	.000	282.84	.083s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING
 pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.7603E+01	3.3949E+01
K-40	<	7.7910E+01	7.7910E+01
MN-54	<	1.7322E+00	1.7945E+00
FE-59	<	4.0250E+00	5.1566E+00
CO-58	<	1.7854E+00	2.0063E+00
CO-60	<	2.1791E+00	2.1916E+00
ZN-65	<	2.6774E+00	2.8013E+00
ZR-95	<	4.1409E+00	4.9192E+00
NB-95	<	2.2919E+00	3.1391E+00
RU-103	<	1.6946E+00	2.2441E+00
RU-106	<	2.1265E+01	2.1912E+01
I-131	<	2.3769E+00	9.3991E+00
CS-134	<	2.4698E+00	2.5062E+00
CS-137	<	2.0201E+00	2.0221E+00
BA-140	<	5.7051E+00	1.3539E+01
LA-140	<	1.5237E+00	3.6160E+00
CE-141	<	5.2053E+00	7.3080E+00
CE-144	<	2.3760E+01	2.4698E+01

< MDA value printed.
 A Activity printed, but activity < MDA.

***** SUMMARY *****
 TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 & CE-141	284.30 % I-131	304.04 & BA-140
320.76 % LA-140	364.48 % I-131	477.61 & BE-7	487.02 % LA-140
497.08 & RU-103	537.32 & BA-140	604.70 % CS-134	610.33 & RU-103
621.84 % RU-106	636.97 & I-131	661.66 % CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 & MN-54	1099.25 & FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1596.18 % LA-140	

! - Peak is part of a multiplet and this area went negative during deconvolution.
 ? - Peak is too narrow.
 @ - Peak is too wide at FW25M, but ok at FWHM.
 % - Peak fails sensitivity test.

Sample description

TW-6763 3.5 LITER
01-OCT-2007 10:31 AMS

Smc
10-24-07

Spectrum Filename: C:\User\47582.An1

Acquisition information

Start time 11-Oct-2007 11:31:07
Live time 8027
Real time 8037
Dead time .13%
Detector/Geometry IDs 4 & 4

Detector system

MCE 1 Input 4

Calibration

Filename: D4g1.Clb
Created: 14-Mar-2007 15:56:03 & 16-Mar-2007 15:10:31
MG 23 Geometry #1
3.5 Liter in MB
Zero offset -.130 keV; Gain .500 keV/channel
Quadratic $-.197E-07$ keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 59.89keV
Stop channel 4048 for an energy of 2024.14keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.0571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	01-Oct-2007 10:31:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkq4w.pbc

10-Aug-2007 10:12:07

geometry correction
Random summing

NO
NO

Energy calibration normalized difference: .3318
No unknown peaks passed sensitivity test.

***** IDENTIFIED PEAK SUMMARY *****								
NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV	
CE-144	266.15	132.98	315.	67.	.008	169.31	1.759s	
CE-141	291.43	145.62	118.	32.	.004	140.31	.915	
I-131	572.06	285.98	81.	49.	.006	113.85	1.107s	
BA-140	614.00	306.95	65.	10.	.001	236.64	.000s	
LA-140	655.66	327.79	106.	30.	.004	138.09	.937s	
I-131	729.06	364.49	38.	6.	.001	294.35	.563s	
BE-7	957.89	478.94	27.	19.	.002	105.26	1.192	
LA-140	972.45	486.22	39.	19.	.002	122.76	1.439	
RU-103	992.95	496.47	27.	7.	.001	223.15	.688s	
BA-140	1078.24	539.12	39.	16.	.002	161.51	.680s	
CS-134	1209.36	604.70	25.	5.	.001	313.50	1.665D	
RU-103	1220.62	610.33	61.	25.	.003	98.18	1.669D	
RU-106	1245.22	622.63	27.	21.	.003	98.43	1.212	
I-131	1272.44	636.24	19.	8.	.001	172.88	1.231	
CS-137	1322.22	661.14	20.	12.	.001	156.53	.527s	
ZR-95	1447.00	723.54	7.	1.	.000	565.69	.104s	
ZR-95	1513.42	756.76	4.	1.	.000	600.00	.635s	
NB-95	1527.72	763.91	17.	6.	.001	248.43	.408s	
CS-134	1596.12	798.11	20.	16.	.002	129.03	.759s	
CO-58	1616.00	808.05	20.	4.	.000	449.94	.000s	
MN-54	1673.32	836.72	7.	11.	.001	102.22	2.778s	
FE-59	2198.09	1099.14	8.	21.	.003	74.30	1.400s	
ZN-65	2232.30	1116.24	6.	5.	.001	191.83	.511s	
CO-60	2347.25	1173.73	4.	6.	.001	136.08	.607s	
FE-59	2580.22	1290.22	6.	1.	.000	659.00	.447s	
CO-60	2667.38	1333.80	0.	11.	.001	60.30	1.500s	
K-40	2919.80	1469.03	0.	30.	.004	36.51	1.550s	
LA-140	3184.24	1592.25	3.	14.	.002	80.81	1.090s	

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****			
NUCLIDE	ACTIVITY	TIME OF COUNT TIME CORRECTED ACTIVITY	UNCERTAINTY 2 SIGMA COUNTING
	pCi/LITER	pCi/LITER	pCi/LITER

BE-7	<	4.1105E+01	4.6841E+01
K-40	<	9.6645E+01	9.6645E+01
MN-54	<	3.3326E+00	3.4077E+00

CO-60	<	1.8319E+00	1.8386E+00
ZN-65	<	7.6045E+00	7.8247E+00
ZR-95	<	6.4381E+00	7.1776E+00
NB-95	<	4.6767E+00	5.7037E+00
RU-103	<	4.5400E+00	5.4207E+00
RU-106	<	5.5650E+01	5.6712E+01
I-131	<	5.2422E+00	1.2485E+01
CS-134	<	4.7428E+00	4.7857E+00
CS-137	<	5.7974E+00	5.8011E+00
BA-140	<	2.1379E+01	3.6888E+01
LA-140	<	6.3030E+00	1.0876E+01
CE-141	<	7.3568E+00	9.1138E+00
CE-144	<	5.0805E+01	5.2061E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (59.9 to 2024.1 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 % CE-141	284.30 & I-131	304.84 & BA-140
328.76 & LA-140	364.48 % I-131	477.61 & BE-7	487.02 & LA-140
497.08 % RU-103	537.32 & BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 & NB-95	795.84 & CS-134	810.77 & CO-58
834.84 & MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 & FE-59	1332.50 & CO-60	1460.81 % K-40	1596.18 & LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
- = - Peak outside analysis energy range.
- & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
- P - Peakbackground subtraction

Sample description
TWU-6764 3.5 LITER
01-OCT-2007 12:30 AMS

Spec
10-21-07

Spectrum Filename: C:\User\57500.An1

Acquisition information

Start time 11-Oct-2007 11:45:39
Live time .0693
Real time .0695
Dead time .03%
Detector/Geometry IDs 5 & 0

Detector system
MCB 5 Input 1

Calibration

Filename: D5g1.C1b
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB
Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4048 for an energy of 2031.42keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limits: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	01-Oct-2007 12:30:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc
		10-Aug-2007 09:55:42
Absorption (Internal)	NO	

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
1010.66	510.33	48.	121.	2.571E+04	34.07	1.491	J-133 s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	256.00	132.96	118.	8.	.001	412.06	.132s
CE-141	201.31	145.45	51.	11.	.001	175.38	.587s
I-131	560.58	203.41	20.	7.	.001	226.78	.675s
BA-140	601.00	303.83	39.	5.	.001	390.51	.912s
LA-140	648.51	326.90	47.	7.	.001	371.79	.344s
I-131	722.57	363.56	12.	3.	.000	290.59	.650s
BE-7	949.34	475.94	24.	11.	.001	188.07	.607s
LA-140	969.60	485.99	9.	1.	.000	802.77	.583s
RU-103	989.37	495.80	33.	16.	.002	172.15	.559s
BA-140	1072.33	536.98	6.	1.	.000	489.90	.497s
CS-134	1208.66	604.70	20.	11.	.001	130.64	1.791D
RU-103	1219.99	610.33	34.	19.	.002	97.85	1.796D
RU-106	1243.00	621.77	5.	0.	.000	512.08	.000s
I-131	1276.10	638.26	13.	16.	.002	113.96	.575s
CS-137	1321.86	660.98	8.	19.	.002	80.90	1.011s
ZR-95	1450.00	724.76	4.	1.	.000	400.00	.000s
ZR-95	1512.01	755.64	8.	15.	.002	88.84	.855s
NE-95	1528.67	763.94	6.	1.	.000	659.00	1.495
CS-134	1594.00	796.50	9.	1.	.000	1011.05	.000s
CO-58	1624.71	811.81	4.	20.	.002	60.00	1.470
MN-54	1670.73	834.76	3.	2.	.000	317.40	.416s
FE-59	2198.13	1098.36	3.	12.	.001	83.57	.556s
ZN-65	2233.33	1115.99	2.	1.	.000	382.97	.451s
CO-60	2345.18	1172.05	4.	3.	.000	261.20	.538s
FE-59	2583.00	1291.40	0.	2.	.000	141.42	.502s
CO-60	2665.50	1332.85	0.	9.	.001	66.67	.503s
K-40	2918.49	1460.14	5.	19.	.002	73.54	.505s
LA-140	3187.00	1595.50	0.	2.	.000	141.42	.505s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	COUNT TIME CORRECTED	UNCERTAINTY	2 SIGMA
	ACTIVITY	ACTIVITY	COUNTING	
	pCi/LITER	pCi/LITER	pCi/LITER	
BE-7	<	4.1964E+01	4.7775E+01	
K-40	<	8.4581E+01	8.4581E+01	
MN-54	<	3.2033E+00	3.2750E+00	
FE-59	<	4.9371E+00	5.7663E+00	
CO-58	<	3.1610E+00	3.4050E+00	
CO-60	<	3.4873E+00	3.4998E+00	
ZN-65	<	4.8069E+00	4.9451E+00	
ZR-95	<	7.7997E+00	8.6887E+00	
NB-95	<	4.1259E+00	5.0248E+00	
RU-103	<	5.6604E+00	6.7497E+00	
RU-106	<	3.3462E+01	3.4096E+01	
I-131	<	3.2402E+00	7.6687E+00	
CS-134	<	4.7779E+00	4.8219E+00	
CS-137	<	3.8040E+00	3.8064E+00	
BA-140	<	8.8662E+00	1.5238E+01	
LA-140	<	4.7813E+00	8.2175E+00	
CE-141	<	5.6041E+00	6.9318E+00	
CE-144	<	3.8509E+01	3.9454E+01	

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 & I-131	304.84 & BA-140
328.76 & LA-140	364.48 & I-131	477.61 & BE-7	487.02 & LA-140
497.08 & RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 & I-131	661.66 % CS-137	724.18 % ZR-95
756.72 & ZR-95	765.79 & NB-95	795.84 % CS-134	810.77 & CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 & CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-6765 3.5 LITER
01-OCT-2007 12:00 AMS

JK
10-27-07

Spectrum Filename: C:\User\57509.Anl

Acquisition information

Start time 11-Oct-2007 14:14:34
Live time 8001
Real time 8003
Dead time .03%
Detector/Geometry IDs 5 & 0

Detector system
MCB 5 Input 1

Calibration

Filename: D5g1.Clb
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB

Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4040 for an energy of 2031.42keV
Peak rejection level 30.000X
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000X
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	01-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc

10-Aug-2007 09:55:42

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
697.59	351.19	82.	91.	1.393E+04	51.94	1.224	CE-143 s
1216.63	608.66	17.	94.	2.336E+04	24.11	1.794	XE-135 D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	255.00	132.47	126.	60.	.007	115.18	.691s
CE-141	281.42	145.50	59.	1.	.000	1337.91	.355s
I-131	563.73	284.96	31.	5.	.001	327.41	.898s
BA-140	603.10	304.43	41.	12.	.002	170.39	1.025s
LA-140	652.61	328.93	25.	2.	.000	508.70	.709s
I-131	725.00	364.76	14.	1.	.000	748.33	.000s
BE-7	953.03	477.77	37.	10.	.001	232.88	.500s
LA-140	975.95	489.14	21.	14.	.002	125.36	.969s
RU-103	991.64	496.93	15.	8.	.001	167.86	.928s
BA-140	1072.50	537.06	5.	0.	.000	447.21	.579s
CS-134	1208.66	604.70	22.	5.	.001	255.63	1.791D
RU-103	1219.99	610.33	112.	1.	.000	2237.30	1.796D
RU-106	1242.00	621.27	2.	0.	.000	282.84	.000s
I-131	1276.60	638.47	9.	9.	.001	133.33	.497s
CS-137	1321.98	661.04	11.	0.	.001	166.53	1.354
ZR-95	1444.31	721.92	28.	15.	.002	180.51	.443s
ZR-95	1516.20	757.73	5.	4.	.000	187.08	.536s
NB-95	1533.78	766.49	4.	1.	.000	503.32	.785s
CS-134	1590.82	794.92	4.	2.	.000	323.21	1.088s
CO-58	1624.14	811.53	1.	1.	.000	274.05	.879s
MN-54	1670.79	834.79	6.	16.	.002	79.06	2.045
FE-59	2199.60	1099.10	4.	0.	.001	122.47	1.419s
ZN-65	2232.50	1115.58	1.	1.	.000	312.69	.835s
CO-60	2348.00	1173.46	1.	0.	.000	200.00	.000s
FE-59	2583.26	1291.53	2.	9.	.001	102.05	.477s
CO-60	2662.20	1331.20	0.	5.	.001	89.44	1.005s
K-40	2928.59	1461.20	7.	29.	.004	60.91	1.343s
LA-140	3188.00	1596.00	0.	4.	.000	100.00	.505s

s Peak fails shape tests.
D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED	UNCERTAINTY	2 SIGMA
	ACTIVITY	ACTIVITY	COUNTING	
	pCi/LITER	pCi/LITER	pCi/LITER	
BE-7	< 5.5053E+01	6.2770E+01		
K-40	< 9.3711E+01	9.3711E+01		
MN-54	< 4.3697E+00	4.4687E+00		
FE-59	< 6.5697E+00	7.6879E+00		
CO-58	< 2.2290E+00	2.4604E+00		
CO-60	< 3.6349E+00	3.6482E+00		
ZN-65	< 4.2643E+00	4.3884E+00		
ZR-95	< 7.0888E+00	7.9074E+00		
NB-95	< 3.9937E+00	4.0757E+00		
RU-103	< 4.3834E+00	5.2385E+00		
RU-106	< 3.0121E+01	3.0699E+01		
I-131	< 3.6467E+00	8.7240E+00		
CS-134	< 5.3662E+00	5.4162E+00		
CS-137	< 4.7830E+00	4.7861E+00		
BA-140	< 9.1847E+00	1.5892E+01		
LA-140	< 4.9838E+00	8.6235E+00		
CE-141	< 6.5234E+00	8.0903E+00		
CE-144	< 4.3108E+01	4.4180E+01		

< MDA value printed.
 @ Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 @ CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 % LA-140	364.48 % I-131	477.61 % BE-7	487.02 & LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 & I-131	661.66 % CS-137	724.18 & ZR-95
756.72 & ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 & CO-60	1460.81 % K-40	1596.18 % LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M; but ok at FWHM.
- % - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

- + - Peak activity higher than counting uncertainty range.
 - - Peak activity lower than counting uncertainty range.
 - = - Peak outside analysis energy range.
 - & - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
 - P - Peakbackground subtraction
-

Sample description
TWW-6766 3.5 LITER
28-SEP-2007 10:07 AMS

Inc
10-17-07

Spectrum Filename: C:\User\17695.Anl

Acquisition information

Start time 11-Oct-2007 13:04:01
Live time 7301
Real time 7310
Dead time .13%
Detector/Geometry IDs 1 & 0

Detector system

MCB 1 Input 1

Calibration

Filename: dlgl.Clb
Created: 14-Mar-2007 13:36:49 & 20-Mar-2007 13:52:58
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset -1.980 keV; Gain .501 keV/channel
Quadratic .120E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 58.13keV
Stop channel 4048 for an energy of 2026.06keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06 / (1.0000E+00 * 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method
Additional random errors: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	28-Sep-2007 10:07:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg1w.pbc

10-Aug-2007 10:00:43

Energy calibration normalized difference: .0280

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
705.39	351.39	128.	98. 7.830E+03	54.05	1.612	PB-214
1219.44	608.91	39.	78. 9.062E+03	32.03	1.847	BI-214 D

s Peak fails shape tests.
D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	269.00	132.78	166.	15.	.002	248.37 .656s
CE-141	293.17	144.88	216.	34.	.005	153.62 .998s
I-131	573.09	285.11	95.	17.	.002	189.52 .485s
BA-140	613.30	305.26	102.	24.	.003	151.38 .515s
LA-140	655.87	326.58	112.	11.	.002	345.61 1.039s
I-131	732.00	364.72	28.	2.	.000	547.72 .000s
BE-7	959.05	478.46	24.	7.	.001	211.89 1.032s
LA-140	970.73	484.32	48.	15.	.002	194.29 .842s
RU-103	997.89	497.92	37.	21.	.003	117.01 .487s
BA-140	1075.82	536.96	43.	52.	.007	66.40 .527s
CS-134	1211.03	604.70	24.	1.	.000	1459.05 1.845D
RU-103	1222.27	610.33	107.	3.	.000	1059.01 1.848D
RU-106	1244.00	621.22	10.	1.	.000	663.32 .225s
I-131	1274.90	636.70	12.	3.	.000	286.36 .611s
CS-137	1323.19	660.89	17.	25.	.003	75.26 1.265s
ZR-95	1450.00	724.42	7.	0.	.000	529.15 .000s
ZR-95	1511.77	755.36	22.	20.	.003	100.33 .593s
NB-95	1533.00	766.00	13.	3.	.000	363.42 .374s
CS-134	1592.94	796.03	24.	11.	.002	177.81 .768s
CO-58	1622.00	810.59	6.	1.	.000	600.00 .000s
MN-54	1669.50	834.39	2.	0.	.000	282.84 .585s
FE-59	2198.33	1099.33	4.	1.	.000	400.00 .429s
ZN-65	2231.00	1115.70	3.	0.	.000	346.41 .000s
CO-60	2347.00	1173.81	1.	0.	.000	200.00 .000s
FE-59	2576.80	1288.94	8.	10.	.001	129.61 1.392s
CO-60	2665.00	1333.13	3.	2.	.000	282.84 .731s
K-40	2919.96	1460.87	6.	88.	.011	27.48 2.138
LA-140	3189.63	1595.98	1.	1.	.000	312.69 .751s

s Peak fails shape tests.
D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.5070E+01	2.9747E+01
K-40	<	8.4757E+01	8.4757E+01
MN-54	<	1.5581E+00	1.6042E+00
FE-59	<	4.1095E+00	5.0413E+00
CO-58	<	1.8284E+00	2.0790E+00
CO-60	<	2.5670E+00	2.5791E+00
ZN-65	<	2.9960E+00	3.1099E+00
ZR-95	<	6.3512E+00	7.3200E+00
NB-95	<	2.9497E+00	3.8235E+00
RU-103	<	3.3524E+00	4.2265E+00
RU-106	<	2.3910E+01	2.4500E+01
I-131	<	2.8802E+00	8.9520E+00
CS-134	<	2.8574E+00	2.8921E+00
CS-137	<	3.2758E+00	3.2785E+00
BA-140	<	1.4705E+01	2.9995E+01
LA-140	<	3.2567E+00	6.6430E+00
CE-141	<	8.3637E+00	1.1065E+01
CE-144	<	3.2981E+01	3.4051E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (58.1 to 2026.1 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 % CE-144	145.44 % CE-141	284.30 % I-131	304.84 % BA-140
328.76 & LA-140	364.48 % I-131	477.61 % BE-7	487.02 & LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 % RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 & ZR-95	765.79 % NB-95	795.84 % CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 % ZN-65	1173.24 % CO-60
1291.60 & FE-59	1332.50 % CO-60	1460.81 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

\$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description

TWW-6767 3.5 LITER
28-SEP-2007 11:42 AMS

Spectrum Filename: C:\User\87671.Ani

Smc
10-17-07

Acquisition information

Start time 11-Oct-2007 11:15:31
Live time 7512
Real time 7515
Dead time .05%
Detector/Geometry IDs 8 & 0

Detector system

MCB 5 Input 4

Calibration

Filename: D0g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4040 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05
Detection limit method:
RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	28-Sep-2007 11:42:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg@w.pbc
		10-Aug-2007 10:05:21

Energy calibration normalized difference: .4279

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY % AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
702.00	351.52	82.	101.	0.681E+03	41.01	1.145	PB-214
1021.25	510.70	51.	181.	2.065E+04	24.38	1.686	TL-208 s
1218.10	609.13	31.	126.	1.642E+04	27.64	1.911	BI-214 s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	268.21	134.20	141.	17.	.002	221.07	.597s
CE-141	289.27	144.73	254.	28.	.004	230.79	.437s
I-131	564.00	282.00	92.	7.	.001	515.79	.203s
BA-140	612.00	306.00	29.	1.	.000	1261.39	.000s
LA-140	656.27	328.21	33.	3.	.000	602.22	.575s
I-131	729.23	364.70	39.	13.	.002	175.41	.573s
BE-7	953.10	476.63	27.	4.	.001	460.98	.610s
LA-140	974.20	487.10	29.	12.	.002	162.53	.562s
RU-103	993.00	496.58	11.	0.	.000	663.32	.167s
BA-140	1073.60	536.88	6.	1.	.000	529.15	.700s
CS-134	1209.24	604.70	24.	0.	.000	.00	1.790
RU-103	1220.50	610.33	141.	0.	.000	.00	1.794
RU-106	1245.17	622.66	10.	2.	.000	391.58	.625s
I-131	1277.25	638.71	17.	22.	.003	84.24	.841s
CS-137	1321.00	660.58	9.	2.	.000	501.03	.554s
ZR-95	1447.00	723.59	7.	1.	.000	646.36	.563s
ZR-95	1514.45	757.31	7.	10.	.001	102.62	.868s
NE-95	1532.00	766.09	6.	0.	.000	489.90	.000s
CS-134	1589.75	794.97	11.	19.	.002	97.55	.486s
CO-58	1620.00	810.09	4.	0.	.000	400.00	.167s
MN-54	1667.00	833.59	6.	3.	.000	258.20	1.250s
FE-59	2199.34	1099.79	6.	22.	.003	72.55	.681s
ZN-65	2230.00	1115.13	1.	0.	.000	200.00	.000s
CO-60	2351.02	1175.65	4.	25.	.003	57.05	.624s
FE-59	2582.67	1291.49	3.	1.	.000	331.66	.372s
CO-60	2664.04	1332.18	3.	9.	.001	102.63	1.056s
K-40	2919.21	1459.80	4.	58.	.008	31.50	1.633s
LA-140	3190.60	1595.53	2.	7.	.001	125.70	.680s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED	UNCERTAINTY	2 SIGMA
	ACTIVITY	ACTIVITY	COUNTING	
	pCi/LITER	pCi/LITER	pCi/LITER	
BE-7	< 2.6701E+01	3.1613E+01		
K-40	< 7.3000E+01	7.3000E+01		
MN-54	< 2.3696E+00	2.4309E+00		
FE-59	< 5.2346E+00	6.4073E+00		
CO-58	< 1.6734E+00	1.9002E+00		
CO-60	< 2.0709E+00	2.0006E+00		
ZN-65	< 1.9523E+00	2.0257E+00		
ZR-95	< 3.5677E+00	4.1060E+00		
NB-95	< 2.1661E+00	2.7999E+00		
RU-103	< 1.9477E+00	2.4494E+00		
RU-106	< 2.4520E+01	2.5126E+01		
I-131	< 3.2600E+00	1.0010E+01		
CS-134	< 3.1413E+00	3.1790E+00		
CS-137	< 2.5717E+00	2.5730E+00		
BA-140	< 6.2342E+00	1.2619E+01		
LA-140	< 2.1499E+00	4.3518E+00		
CE-141	< 8.8508E+00	1.1685E+01		
CE-144	< 2.9697E+01	3.0650E+01		

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 * CE-144	145.44 * CE-141	204.30 & I-131	304.84 & BA-140
328.76 * LA-140	364.48 * I-131	477.61 & BE-7	487.02 * LA-140
497.00 * RU-103	537.32 * BA-140	610.33 RU-103	621.84 * RU-106
636.97 & I-131	661.66 & CS-137	724.18 * ZR-95	756.72 * ZR-95
765.79 * NB-95	795.84 * CS-134	810.77 * CO-58	834.84 & MN-54
1099.25 * FE-59	1115.55 * ZN-65	1173.24 & CO-60	1291.60 * FE-59
1332.50 * CO-60	1460.81 * K-40	1596.18 * LA-140	

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- * - Peak fails sensitivity test.
- \$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
- + - Peak activity higher than counting uncertainty range.

Sample description
TWW-6768 3.5 LITER
28-SEP-2007 14:15 AMS

See
10-17-07

Spectrum Filename: C:\User\87672.An1

Acquisition information

Start time 11-Oct-2007 13:25:25
Live time 8190
Real time 8193
Dead time .03%
Detector/Geometry IDs 8 & 0

Detector system

MCE 5 Input 4

Calibration

Filename: D0g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB
Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

	Status	Comments
Decay correct to date	YES	28-Sep-2007 14:15:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg0w.pbc

10-Aug-2007 10:05:21

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
702.33	351.25	68.	129. 1.110E+04	30.10	1.368	CE-143
1021.72	510.94	65.	163. 1.861E+04	27.11	2.051	TL-208 s
1217.15	608.66	47.	101. 1.322E+04	27.52	1.793	XE-135 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	267.30	133.74	105.	12.	.002	199.85 .264s
CE-141	289.01	144.60	159.	18.	.002	215.04 .694s
I-131	564.80	282.48	145.	26.	.003	201.15 .590s
BA-140	609.62	304.89	98.	55.	.007	80.15 .629s
LA-140	655.24	327.70	56.	7.	.001	311.68 .792s
I-131	726.92	363.54	66.	12.	.001	241.52 .909s
BE-7	955.00	477.58	17.	4.	.000	282.26 .000s
LA-140	975.29	487.73	36.	17.	.002	131.53 2.014
RU-103	994.83	497.49	65.	16.	.002	230.83 .467s
BA-140	1073.54	536.85	13.	1.	.000	640.31 .618s
CS-134	1209.24	604.70	30.	2.	.000	1014.30 1.790D
RU-103	1220.50	610.33	124.	10.	.001	331.20 1.794D
RU-106	1241.62	620.89	40.	26.	.003	133.82 .894s
I-131	1274.21	637.19	31.	24.	.003	98.62 .634s
CS-137	1322.06	661.11	24.	13.	.002	152.32 1.159s
ZR-95	1448.51	724.34	23.	9.	.001	214.56 .798s
ZR-95	1513.84	757.01	17.	11.	.001	144.33 .851s
NB-95	1530.00	765.09	13.	1.	.000	1039.23 .820s
CS-134	1593.84	797.01	20.	22.	.003	104.66 .632s
CO-58	1621.00	810.59	5.	1.	.000	447.21 .000s
MN-54	1669.00	834.59	8.	3.	.000	290.59 .642s
FE-59	2197.39	1098.82	8.	10.	.001	126.60 1.941
ZN-65	2233.00	1116.63	4.	1.	.000	557.77 .000s
CO-60	2346.13	1173.20	9.	5.	.001	256.57 .543s
FE-59	2583.07	1291.69	4.	3.	.000	220.73 .273s
CO-60	2664.92	1332.62	2.	8.	.001	94.50 .661s
K-40	2920.06	1460.22	7.	65.	.008	32.85 2.042s
LA-140	3189.50	1594.98	0.	4.	.000	100.00 2.001

s Peak fails shape tests.
 D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	1.9922E+01	2.3582E+01
K-40	<	7.3100E+01	7.3100E+01
MN-54	<	2.4334E+00	2.5045E+00
FE-59	<	5.3629E+00	6.5627E+00
CO-58	<	1.6246E+00	1.8444E+00
CO-60	<	1.4086E+00	1.4152E+00
ZN-65	<	3.6549E+00	3.7921E+00
ZR-95	<	5.0667E+00	5.8302E+00
NB-95	<	2.7037E+00	3.4937E+00
RU-103	<	4.3423E+00	5.4593E+00
RU-106	<	4.3148E+01	4.4214E+01
I-131	<	3.8908E+00	1.1930E+01
CS-134	<	3.2160E+00	3.2546E+00
CS-137	<	3.6146E+00	3.6176E+00
BA-140	<	7.9678E+00	1.6114E+01
LA-140	<	1.2522E+00	2.5326E+00
CE-141	<	6.4319E+00	8.4807E+00
CE-144	<	2.3516E+01	2.4269E+01

< MDA value printed.

A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 0.0000000E+00 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54 % CE-144	145.44 & CE-141	204.30 & I-131	304.84 % BA-140
328.76 & LA-140	364.48 & I-131	477.61 % BE-7	487.02 % LA-140
497.08 % RU-103	537.32 % BA-140	604.70 % CS-134	610.33 % RU-103
621.84 & RU-106	636.97 % I-131	661.66 % CS-137	724.18 % ZR-95
756.72 % ZR-95	765.79 % NB-95	795.84 & CS-134	810.77 % CO-58
834.84 % MN-54	1099.25 % FE-59	1115.55 & ZN-65	1173.24 % CO-60
1291.60 % FE-59	1332.50 % CO-60	1460.01 % K-40	1596.18 % LA-140

! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.

* - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description
TWW-6769 3.5 LITER
03-OCT-2007 12:00 EG

Spectrum Filename: C:\User\57493.An1

Sum
10-17-07

Acquisition information

Start time 06-Oct-2007 11:44:34
Live time 12116
Real time 12119
Dead time .03%
Detector/Geometry IDs 5 & 0

Detector system
MCB 5 Input 1

Calibration

Filename: D5g1.C1b
Created: 19-Mar-2007 11:09:29 & 19-Mar-2007 13:14:53
MG #23 GEOMETRY #1
3.5 Liter water in MB

Zero offset 6.797 keV; Gain .492 keV/channel
Quadratic .193E-05 keV/channel²

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 65.91keV
Stop channel 4048 for an energy of 2031.42keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor $1.0000E+06 / (1.0000E+00 * 3.5000E+00)$
= 2.8571E+05

Detection limit method:

RISØ method
Additional random error: 1.0000000E+00
Additional systematic error: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	03-Oct-2007 12:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg5w.pbc
		10-Aug-2007 09:55:42
Absorption (Internal)	NO	
Geometry correction	NO	

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
698.54	351.67	99.	162.	2.492E+04	32.33	1.839	PB-214 s
1216.71	608.70	31.	114.	2.830E+04	23.34	1.794	XE-135 D

s Peak fails shape tests.
 D Peak area deconvoluted.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CHANNEL	CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	257.32	133.62	187.	69.	.006	133.65	.710s
CE-141	279.04	144.33	79.	5.	.000	450.40	.257s
I-131	562.00	284.11	27.	0.	.000	1039.23	.000s
BA-140	603.00	304.38	26.	0.	.000	1019.80	.000s
LA-140	654.32	329.78	63.	16.	.001	192.24	.481s
I-131	723.67	364.10	21.	1.	.000	806.23	.606s
BE-7	954.00	478.25	7.	0.	.000	529.15	.000s
LA-140	972.39	487.38	17.	6.	.000	210.82	.779s
RU-103	993.89	498.04	28.	36.	.003	70.13	2.280s
BA-140	1075.39	538.49	33.	12.	.001	192.21	.508s
CS-134	1208.66	604.70	34.	9.	.001	201.28	1.791D
RU-103	1219.99	610.33	42.	0.	.000	.00	.389D
RU-106	1245.31	622.92	35.	11.	.001	240.06	1.551
I-131	1269.47	634.93	17.	6.	.001	240.43	.500s
CS-137	1316.00	658.07	24.	12.	.001	176.62	.000s
ZR-95	1448.50	724.01	5.	0.	.000	447.21	.581s
ZR-95	1513.63	756.45	5.	2.	.000	321.46	.502s
NB-95	1533.74	766.47	10.	23.	.002	69.02	1.542
CS-134	1592.38	795.69	9.	9.	.001	133.33	1.122s
CO-58	1627.25	813.08	12.	13.	.001	120.16	.582s
MN-54	1669.54	834.17	5.	1.	.000	412.31	.616s
FE-59	2199.82	1099.21	4.	11.	.001	87.84	.765s
ZN-65	2232.00	1115.33	2.	0.	.000	282.84	.000s
CO-60	2347.36	1173.14	2.	9.	.001	86.97	.710s
FE-59	2583.50	1291.65	3.	2.	.000	263.42	.628s
CO-60	2665.00	1332.60	1.	0.	.000	280.00	.000s
K-40	2919.28	1468.54	9.	15.	.001	93.85	1.673s
LA-140	3188.00	1596.00	1.	1.	.000	200.00	.202s

s Peak fails shape tests.
 D Peak area deconvoluted.

***** SUMMARY OF NUCLIDES IN SAMPLE *****

NUCLIDE	TIME OF COUNT	TIME CORRECTED	UNCERTAINTY	2 SIGMA
	ACTIVITY	ACTIVITY	COUNTING	
	pCi/LITER	pCi/LITER	pCi/LITER	
BE-7	< 1.9471E+01	2.0244E+01		
K-40	< 7.4143E+01	7.4143E+01		
MN-54	< 2.9101E+00	2.9295E+00		
FE-59	< 4.1535E+00	4.3514E+00		
CO-58	< 3.5999E+00	3.7068E+00		
CO-60	< 3.2836E+00	3.2872E+00		
ZN-65	< 3.4487E+00	3.4781E+00		
ZR-95	< 5.1504E+00	5.3198E+00		
NB-95	< 3.7052E+00	3.9308E+00		
RU-103	< 3.8840E+00	4.0945E+00		
RU-106	< 4.9774E+01	5.0055E+01		
I-131	< 2.9821E+00	3.8611E+00		
CS-134	< 4.4650E+00	4.4773E+00		
CS-137	< 4.6891E+00	4.6899E+00		
BA-140	< 1.5641E+01	1.8398E+01		
LA-140	< 4.2499E+00	4.9992E+00		
CE-141	< 5.0156E+00	5.3458E+00		
CE-144	< 3.4694E+01	3.4947E+01		

< MDA value printed.
 A Activity printed, but activity < MDA.

S U M M A R Y

TOTAL ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER
 TOTAL DECAYED ACTIVITY (65.9 to 2031.4 keV) 0.0000000E+00 pCi/LITER

***** SUMMARY OF DISCARDED PEAKS *****

133.54 * CE-144	145.44 & CE-141	204.30 * I-131	304.84 * BA-140
328.76 & LA-140	364.48 * I-131	477.61 * BE-7	487.02 * LA-140
497.08 & RU-103	537.32 & BA-140	604.70 * CS-134	610.33 & RU-103
621.84 & RU-106	636.97 & I-131	661.66 & CS-137	724.18 * ZR-95
756.72 * ZR-95	765.79 * NB-95	795.84 * CS-134	810.77 & CO-58
834.84 * MN-54	1099.25 * FE-59	1115.55 * ZN-65	1173.24 * CO-60
1291.60 * FE-59	1332.50 * CO-60	1460.81 * K-40	1596.18 * LA-140

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.
- * - Peak fails sensitivity test.
- # - Peak identified, but first peak of this nuclide failed one or more qualification tests.

Sample description

TWW-6770 3.5 LITER
03-OCT-2007 13:00 AMS

Spectrum Filename: C:\User\87679.Anl

*File
10-29-07*

Acquisition information

Start time 13-Oct-2007 11:51:55
Live time 7491
Real time 7493
Dead time .03%
Detector/Geometry IDs B & 0

Detector system

MCB 5 Input 4

Calibration

Filename: D0g1.C1b
Created: 14-Mar-2007 15:26:41 & 15-Mar-2007 12:07:06
MG #23 Geometry #1
3.5 Liter water in MB

Zero offset .105 keV; Gain .500 keV/channel
Quadratic .293E-07 keV/channel^2

Library Files

Main analysis library: 2.lib
Library Match Width: .500

Analysis parameters

Start channel 120 for an energy of 60.10keV
Stop channel 4048 for an energy of 2024.36keV
Peak rejection level 30.000%
Peak search sensitivity: 3
Sample Size: 3.500
Activity scaling factor 1.0000E+06/(1.0000E+00* 3.5000E+00)
= 2.8571E+05

Detection limit method:

RISØ method

Additional random errors: 1.0000000E+00
Additional systematic errors: 1.0000000E+00
Fraction Limit: .000%
Background width: best method (based on spectrum).

Corrections

Corrections	Status	Comments
Decay correct to date	YES	03-Oct-2007 13:00:00
Decay during acquisition	YES	
Decay during collection	NO	
Peaked background correction	YES	bkg0w.pbc

10-Aug-2007 10:05:21

Energy calibration normalized difference: 1.0000

***** UNIDENTIFIED PEAK SUMMARY *****

CHANNEL	PEAK CENTROID ENERGY	BACKGROUND COUNTS	NET AREA COUNTS	EFFICIENCY * AREA	UNCERT 2 SIGMA %	FWHM keV	SUSPECTED NUCLIDE
588.38	294.27	131.	126.	9.491E+03	42.95	2.278	PA-234 sM
702.85	351.51	109.	172.	1.475E+04	32.01	1.583	PR-214 s
1217.94	609.05	46.	114.	1.482E+04	25.30	1.793	BI-214 D
2238.95	1119.60	15.	38.	7.937E+03	43.07	2.124	BI-214 D

s Peak fails shape tests.
D Peak area deconvoluted.
M Peak is close to a library peak.

***** IDENTIFIED PEAK SUMMARY *****

NUCLIDE	PEAK CENTROID CHANNEL	BACKGROUND ENERGY	NET AREA COUNTS	INTENSITY CTS/SEC	UNCERT 2 SIGMA %	FWHM keV
CE-144	265.93	133.06	144.	30.	.004	135.65 .012s
CE-141	288.46	144.32	262.	62.	.008	111.95 1.058
I-131	567.94	284.06	47.	5.	.001	341.87 .425s
BA-140	606.87	303.52	55.	18.	.002	139.75 1.033s
LA-140	655.21	327.69	80.	23.	.003	148.00 1.056s
I-131	730.00	365.08	51.	13.	.002	198.22 .612s
BE-7	952.59	476.38	30.	9.	.001	205.69 .463s
LA-140	971.53	485.84	29.	7.	.001	230.35 .605s
RU-103	991.54	495.85	63.	24.	.003	156.00 .590s
BA-140	1074.00	537.08	6.	0.	.000	489.90 .000s
CS-134	1209.24	604.70	36.	8.	.001	233.98 1.790D
RU-103	1220.50	610.33	187.	0.	.000	.00 .566D
RU-106	1245.00	622.58	0.	0.	.000	565.69 .000s
I-131	1272.95	636.56	18.	7.	.001	257.88 .479s
CS-137	1322.50	661.33	5.	0.	.000	447.21 .583s
ZR-95	1448.78	724.48	12.	8.	.001	164.92 .902s
ZR-95	1511.77	755.98	35.	22.	.003	140.58 1.337
NB-95	1531.20	765.69	9.	2.	.000	450.78 .469s
CS-134	1593.05	796.61	11.	4.	.000	302.37 .771s
CO-58	1622.29	811.23	6.	1.	.000	565.69 .952s
MN-54	1668.00	834.09	2.	0.	.000	282.84 .167s
FE-59	2198.00	1099.12	3.	1.	.000	452.16 .000s
ZN-65	2230.84	1115.55	8.	4.	.001	206.74 2.121D
CO-60	2348.00	1174.14	8.	4.	.000	305.87 .000s
FE-59	2582.50	1291.41	2.	0.	.000	282.84 .583s
CO-60	2663.50	1331.91	2.	0.	.000	282.84 .583s
K-40	2920.28	1460.33	0.	75.	.010	23.09 1.948s
LA-140	3192.00	1596.23	1.	0.	.000	200.00 .000s

s Peak fails shape tests.
D Peak area deconvoluted.

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
 TIME OF COUNT TIME CORRECTED UNCERTAINTY 2 SIGMA
 NUCLIDE ACTIVITY ACTIVITY COUNTING

pCi/LITER pCi/LITER pCi/LITER

BE-7	<	2.8300E+01	3.2221E+01	
K-40	#	9.0345E+01	9.0345E+01	4.260E+01
MN-54	<	1.7633E+00	1.8027E+00	
FE-59	<	4.2910E+00	5.0104E+00	
CO-58	<	1.9943E+00	2.1873E+00	
CO-60	<	1.6086E+00	1.6143E+00	
ZN-65	<	5.4343E+00	5.5902E+00	
ZR-95	<	7.9338E+00	8.8365E+00	
NB-95	<	2.5631E+00	3.1204E+00	
RU-103	<	4.6554E+00	5.5497E+00	
RU-106	<	2.2002E+01	2.3234E+01	
I-131	<	3.7301E+00	8.8345E+00	
CS-134	<	3.8417E+00	3.9770E+00	
CS-137	<	1.9981E+00	1.9994E+00	
BA-140	<	6.2500E+00	1.0732E+01	
LA-140	<	1.4654E+00	2.5163E+00	
CE-141	<	9.0242E+00	1.1150E+01	
CE-144	<	3.0072E+01	3.0009E+01	

- # All peaks for activity calculation had bad shape.
- * Activity omitted from total
- & Activity omitted from total and all peaks had bad shape.
- < MDA value printed.
- A Activity printed, but activity < MDA.

S U M M A R Y
 TOTAL ACTIVITY (60.1 to 2024.4 keV) 9.0345090E+01 pCi/LITER
 TOTAL DECAYED ACTIVITY (60.1 to 2024.4 keV) 9.0345090E+01 pCi/LITER

***** S U M M A R Y O F D I S C A R D E D P E A K S *****

133.54	%	CE-144	145.44	&	CE-141	284.30	%	I-131	304.84	&	BA-140
328.76	&	LA-140	364.48	%	I-131	477.61	&	BE-7	487.02	&	LA-140
497.08	&	RU-103	537.32	%	BA-140	604.70	%	CS-134	610.33	&	RU-103
621.84	%	RU-106	636.97	%	I-131	661.66	%	CS-137	724.18	%	ZR-95
756.72	%	ZR-95	765.79	%	NB-95	795.84	%	CS-134	810.77	%	CO-58
834.84	%	MN-54	1099.25	%	FE-59	1115.55	%	ZN-65	1173.24	%	CO-60
1291.60	%	FE-59	1332.50	%	CO-60	1596.18	%	LA-140			

- ! - Peak is part of a multiplet and this area went negative during deconvolution.
- ? - Peak is too narrow.
- @ - Peak is too wide at FW25M, but ok at FWHM.

TRITIUM

Counter ID:

LSP-2000CA

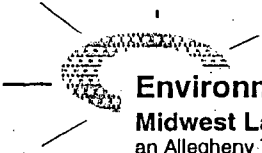
LSP-2550TRI/AB

LSP-2800TR

Init. & Count Date: 15M 10/18/07

0.10032g STD T-36

BKG Time	BKG Counts	Sample Time	STD Time	STD Counts	STD Activity (pCi)	Date Issued
200	1081	100	200	60733	1003.78	01/18/2001
Sample ID		Volume (ml)	Sample Counts		Remarks	
TWW - 6835		13	483		T-27	
6836			441		T-27	
6837			535		T-226	
6749			762			
6750			569			
6751			588			
6755			657			
6756			569			
6760			543		} COUNTED ON 10/19/07	
6761			734			
6762			758			
6763			819			
6764			744			
TWW - 6768		13	494			



Environmental, Inc.

Midwest Laboratory
an Allegheny Technologies Co.
PRG-33
Version No. 1.0 06/17/97
Programmed by Rick Lesko

TRITIUM

RESULTS SHEET

For any sample counted on the LSP-2550TRI/AB,
LSP-2000CA or LSP-2800TR

Reviewed and Approved by: *SAC*

Date approved: _____

Sample Count Time (min.): 100

Standard Count Time (min.): 200

Date Counted: 10/19/2007

Background Count Time (min.): 200

Standard Counts: 60733

Calculated by: Rick

Background Counts: 1081

Counter Efficiency: 0.195

Date Calculated: 10/22/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L Activity ± Error	T.P.U.	3.00 Sigma	4.66 Sigma
TWW-6760	9/25/2007	13.0	543	0.996	4.447 ± 101.463	101.464	124.075	☞ 192.729
TWW-6761	9/25/2007	13.0	734	0.996	☞ 344.227 ± 112.750	122.082	124.075	192.729
TWW-6762	9/25/2007	13.0	758	0.996	☞ 386.922 ± 114.089	125.639	124.075	192.729
TWW-6763	10/1/2007	13.0	819	0.997	☞ 494.981 ± 117.316	135.258	123.960	192.552
TWW-6764	10/1/2007	13.0	744	0.997	☞ 361.683 ± 113.205	123.430	123.960	192.552
TWW-6768	9/28/2007	13.0	494	0.997	-82.683 ± 98.313	98.954	124.017	☞ 192.640

☞ =Best probable result.

Environmental, Inc.
Midwest Laboratory
 an Allegheny Technologies Co.
 PRG-33
 Version No. 1.0 06/17/97
 Programmed by Rick Lesko

TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: *[Signature]*

Date approved: 10-21-07

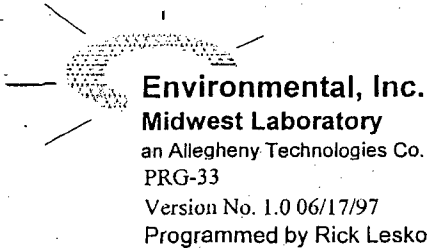
Sample Count Time (min.): 100
 Background Count Time (min.): 200
 Background Counts: 1081

Standard Count Time (min.): 200
 Standard Counts: 60733
 Counter Efficiency: 0.195

Date Counted: 10/18/2007
 Calculated by: Rick
 Date Calculated: 10/22/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L Activity ± Error	T.P.U.	3.00 Sigma	4.66 Sigma
TWW-6835	10/5/2007	13.0	483	0.998	-102.133 ± 97.498	98.483	123.884	☞ 192.433
TWW-6836	10/5/2007	13.0	441	0.998	-176.734 ± 94.741	97.742	123.884	☞ 192.433
TWW-6837	10/5/2007	13.0	535	0.998	-9.769 ± 100.807	100.816	123.884	☞ 192.433
TWW-6749	9/27/2007	13.0	762	0.997	393.916 ± 114.275	126.210	124.036	☞ 192.670
TWW-6750	9/27/2007	13.0	569	0.997	50.685 ± 103.040	103.270	124.036	☞ 192.670
TWW-6751	9/24/2007	13.0	588	0.996	84.513 ± 104.248	104.880	124.094	☞ 192.759
TWW-6755	10/2/2007	13.0	657	0.998	207.025 ± 108.224	111.827	123.941	☞ 192.522
TWW-6756	10/2/2007	13.0	569	0.998	50.646 ± 102.961	103.191	123.941	☞ 192.522

☞ =Best probable result.



TRITIUM

RESULTS SHEET
 For any sample counted on the LSP-2550TRI/AB,
 LSP-2000CA or LSP-2800TR

Reviewed and Approved by: _____

Date approved: _____

Sample Count Time (min.): 100
 Background Count Time (min.): 300
 Background Counts: 1146

Standard Count Time (min.): 100
 Standard Counts: 28457
 Counter Efficiency: 0.185

Date Counted: 11/5/2007
 Calculated by:
 Date Calculated: 11/6/2007

Sample ID.	Coll. Date	Vol. (ml)	Sample Counts	Corr. Factor	pCi/L		T.P.U.	3.00		4.66	
					Activity	± Error		Sigma	Sigma		
TWW-6761	9/25/2007	13.0	632	0.994	472.475	± 104.156	122.382	110.813	172.130		
TWW-6762	9/25/2007	13.0	610	0.994	430.898	± 102.636	118.188	110.813	172.130		
TWW-6763	10/1/2007	13.0	839	0.995	862.889	± 117.390	165.988	110.711	171.971		
TWW-6764	10/1/2007	13.0	598	0.995	407.842	± 101.704	115.846	110.711	171.971		
TWW-6836	10/5/2007	13.0	330	0.995	-98.124	± 80.708	81.804	110.643	171.866		
TWW-6749	9/27/2007	13.0	582	0.994	377.864	± 100.638	112.999	110.779	172.077		
TWW-6755	10/2/2007	13.0	460	0.995	147.254	± 91.505	93.671	110.694	171.945		

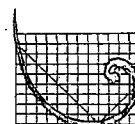
☞ =Best probable result.

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