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# Los Alamos
NATIONAL LABORATORY

*Los Alamos National Laboratory*
*Los Alamos, New Mexico 87545*

Date: December 12, 2000
In Reply Refer To: ESH-18/WQ&H:00-0412
Mail Stop: K497
Telephone: (505) 665-1859

2000 RECEIVED

TA-54

Ms. Phyllis Bustamante
Ground Water Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

Mr. John Young
Hazardous Materials Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

HSWA LANL 6/m/HWP/2000

**SUBJECT: NOTICE OF INTENT (NOI) TO DISCHARGE FOR WELL DEVELOPMENT WATER AND PURGE WATER FROM THE R-22 CHARACTERIZATION WELL**

Dear Ms. Bustamante and Mr. Young:

Los Alamos National Laboratory is submitting the enclosed NOI to the New Mexico Environment Department (NMED) for the discharge of water from the R-22 characterization well. This well is part of the Laboratory's New Characterization Well Installation Project under the Hydrogeologic Workplan. The R-22 well is located near the eastern Laboratory boundary on the mesa between Canada del Buey and Pajarito Canyon. More specifically, it is sited just east of Technical Area (TA)-54, Material Disposal Area (MDA) G. A map including the R-22 well location is enclosed for your review (Enclosure 1).

Well development and purge water has been containerized on site and sampled. Analytical results are below applicable New Mexico Water Quality Control Commission (WQCC) standards. Acetone was identified in several of the water samples. Additional investigation of the Acetone results identified an analytical interference from alcohol used in the drilling foam. The analytical data and a brief report on the Acetone/Alcohol interference are enclosed (Enclosures 2 and 3, respectively). The depth for the R-22 well is 1489 feet.

The total volume of discharge is approximately 200,000 gallons of development and purge water collected from the well. The proposed methods of discharge include land application to the area east of the site, land application to the drilling pad for re-vegetation purposes, or the water may be used for dust suppression at the drilling location.

The Laboratory's Environmental Restoration staff familiar with the area has reviewed the proposed land application area. No SWMU's or PRS's were identified that could be impacted by this discharge. The land application area is situated on a flat mesa top area east of TA-54. Photographs of the area are included with this NOI (Enclosure 5). The proposed discharge area has been reviewed by the NMED's DOE Oversight Bureau (OB) staff. All discharges at this site will be to the mesa top and will not impact a watercourse.

TL

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Please call Harvey Decker at 665-2014 or Steve Veenis at 665-9735 of the Laboratory's Water Quality and Hydrology Group (ESH-18) if you need any additional information.

Sincerely,

Steven Rae
Water Quality and Hydrology Group

SR:HD/tml

Enclosures: a/s

Cy: M. Leavitt, NMED/GWQB, Santa Fe, New Mexico, w/enc.
J. Davis, NMED/SWQB, Santa Fe, New Mexico, w/enc.
B. Lucas, NMED/SWQB, Santa Fe, New Mexico, w/enc.
S. Yanicak, NMED/DOE/OB, w/enc., MS J993
S. Pearson, E-ER, w/enc., MS M992
R. Bohn, E-ER, w/enc., MS M992
D. Broxton, EES-1, w/enc., MS D462
D. Erickson, ESH-DO, w/o enc., MS K491
C. Nylander, ESH-18, w/o enc., MS K497
M. Saladen, ESH-18, w/o enc., MS K497
H. Decker, ESH-18, w/enc., MS K497
S. Veenis, ESH-18, w/o enc., MS K497
A. Crowder, MK, w/o enc., MS M327
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

# NOTICE OF INTENT TO DISCHARGE WATER FROM REGIONAL WELL R-22

**1. Name and address of facility making the discharge.**

Los Alamos National Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

**2. Location of the discharge.**

The R-22 well will be located near the eastern Laboratory boundary on the mesa between Canada del Buey and Pajarito Canyon. More specifically, it is sited just east of Technical Area (TA)-54, Material Disposal Area (MDA) G. A map (Enclosure 1) including the R-22 well location is enclosed. The R-22 well is being drilled as part of the Laboratory's Hydrogeologic Workplan in order to better characterize the regional subsurface of the Pajarito Plateau. All water developed or purged from the well will be stored on site and analyzed prior to discharge. The data from the currently containerized water and a report detailing the Acetone analytical results interference is enclosed (Enclosures 2 and 3). Photographs (Enclosure 5) showing the discharge area in relation to the well site are enclosed.

**3. The means of discharge. (to lagoon, flowing stream, water course, arroyo, septic tank, other).**

The land application of water will be to the location shown in the enclosed photographs, to the mesa top, out of the flood plain. The method of land application is described below:

1. Land application of water to the discharge area east of the drilling site will be accomplished by the use of commonly available water sprinklers connected to a pump and hose transfer system from the containers holding the water. Each sprinkler will be spaced such that application radii do not overlap.

2. The application of water will be monitored periodically each application day by on-site staff to ensure that no ponding or run-off is occurring, to inspect Best Management Practices (BMPs) and to determine when to rotate the area of land application. **Ponding**, is defined as *a body of standing water, often artificially formed.* **Erosion**, is defined as *the process in which, by the actions of wind or water, soil particles are displaced and transported.*

3. The land application site will be monitored during the daytime (normally from 7:00 a.m. to 5:00 p.m. but may vary slightly)discharge hours. This will allow site staff, as necessary, to stop application if a problem with the sprinkler system occurs, such as freezing during the winter months or other problems. Additionally, if the application area shows signs of ponding or saturation, application operations will be immediately halted. The area will be evaluated for the need of any additional BMPs and the application will not start again until the area is suitable (i.e., no standing water, ground saturation or run-off visible). If additional BMP's other than the natural vegetation and administrative controls currently in place are necessary the discharge will be halted until they are implemented.

4. A SOP 2.01 Surface Water Assessment/Erosion Matrix for the land application location has been performed. An assessment of 32.8-surface/ground water impact for the land application area has been determined for the application described (Enclosure 4, SOP 2.01 worksheets).

**4. The estimated concentration of contaminants (if any) in the discharge.**

The analytical data and Confirmation Sampling Report for R-22 Deep Well are enclosed as enclosures 2 and 3. Sample numbers GW54-00-0017 and GW54-00-0019 are non-filtered samples collected for organic and tritium analyses. Samples GW54-00-0018 and GW54-00-0020 are filtered samples from two separate frac-tanks for metals analyses.

**5. The type of operation from which the discharge is derived**

The R-22 Well is part of the on-going study undertaken by the Laboratory in order to better understand the hydrogeologic characteristics of the regional aquifer, intermediate perched zones, and unsaturated zones at the Laboratory. The total estimated discharge is of approximately 200,000 gallons of development and purge water collected from the well.

**6. The estimated flow to be discharged per day.**

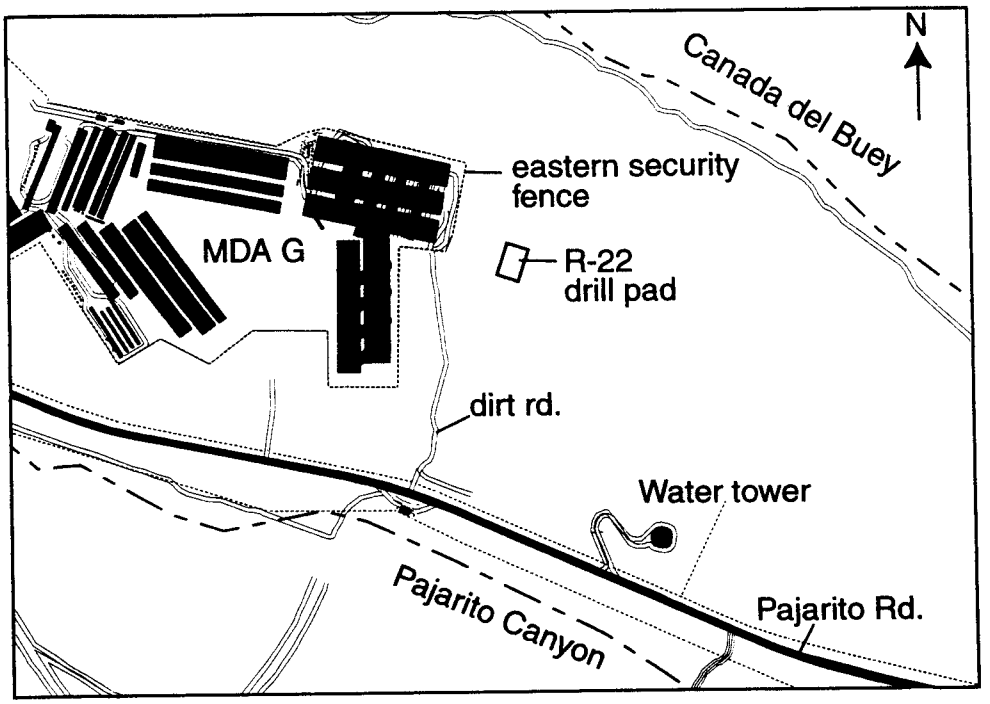
The land application amount from the initial development, purging, sampling and equipment decontamination activities is estimated to be approximately 10,000 gallons per day until all water is expended or used as needed at the site for re-vegetation activities. Additional sampling of the well is expected to occur at least four times a year. Each of the four sampling events is anticipated to generate approximately 100 gallons of purge water per sampling event. The sampling water (approximately 100 gallons per event for four events/year) will be discharged to the original land application area by dumping on to the ground in a manner that will eliminate erosion after analytical results indicate that no WQCC standards are exceeded.

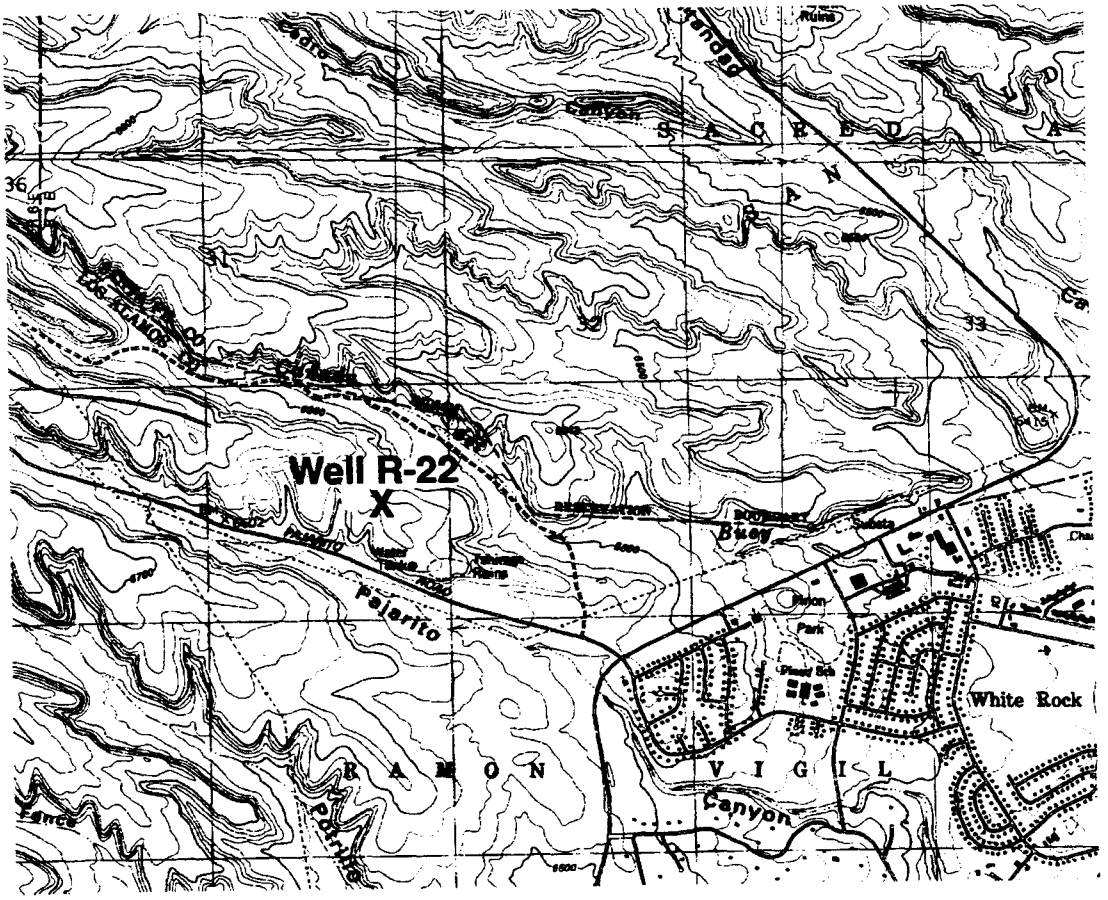
**7. The estimated depth to ground water (if available)**

Current information indicates that the regional aquifer exists at approximately 883 feet below ground level.

Signed: _____ Date: Dec. 12, 2000
Group Leader, ESH-18

ENCLOSURE 1


N
Canada del Buey
eastern security fence
MDA G
R-22 drill pad
dirt rd.
Water tower
Pajarito Canyon
Pajarito Rd.


Well R-22
X
Pajarito
Buey
White Rock
Canyon

ENCLOSURE 2

# GC/MS Volatiles

## Method SW8260

## Sample Results

Lab Name: Paragon Analytics, Inc.
Work Order Number: 0010150
Client Name: Los Alamos National Laboratory SMO
ClientProject ID: 7889R

Field ID: GW54-00-0017
Lab ID: 0010150-1

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 16-Oct-00
Date Extracted: 19-Oct-00
Date Analyzed: 19-Oct-00

Prep Batch: VL001019-3
QCBatchID: VL001019-3-2
Run ID: VL001019-3A
Cleanup: NONE
Basis: As Received

Sample Aliquot: 5 ML
Final Volume: 5 ML
Result Units: UG/L
File Name: C6634

| CASNO | Target Analyte | Dilution Factor | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|---|---|---|---|---|---|---|
| 75-71-8 | DICHLORODIFLUOROMETHANE | 1 | 10 | 10 | U | |
| 74-87-3 | CHLOROMETHANE | 1 | 10 | 10 | U | |
| 75-01-4 | VINYL CHLORIDE | 1 | 10 | 10 | U | |
| 74-83-9 | BROMOMETHANE | 1 | 10 | 10 | U | |
| 75-00-3 | CHLOROETHANE | 1 | 10 | 10 | U | |
| 75-69-4 | TRICHLOROFLUOROMETHANE | 1 | 5 | 5 | U | |
| 75-35-4 | 1,1-DICHLOROETHENE | 1 | 5 | 5 | U | |
| 76-13-1 | TRICHLOROTRIFLUOROETHANE | 1 | 5 | 5 | U | |
| 67-64-1 | ACETONE | 1 | 1700 | 30 | E | |
| 74-88-4 | IODOMETHANE | 1 | 5 | 5 | U | |
| 75-15-0 | CARBON DISULFIDE | 1 | 5 | 5 | U | |
| 75-09-2 | METHYLENE CHLORIDE | 1 | 12 | 5 | B | |
| 156-60-5 | TRANS-1,2-DICHLOROETHENE | 1 | 5 | 5 | U | |
| 75-34-3 | 1,1-DICHLOROETHANE | 1 | 5 | 5 | U | |
| 156-59-2 | CIS-1,2-DICHLOROETHENE | 1 | 5 | 5 | U | |
| 78-93-3 | 2-BUTANONE | 1 | 20 | 20 | U | |
| 74-97-5 | BROMOCHLOROMETHANE | 1 | 5 | 5 | U | |
| 67-66-3 | CHLOROFORM | 1 | 5 | 5 | U | |
| 71-55-6 | 1,1,1-TRICHLOROETHANE | 1 | 5 | 5 | U | |
| 594-20-7 | 2,2-DICHLOROPROPANE | 1 | 5 | 5 | U | |
| 56-23-5 | CARBON TETRACHLORIDE | 1 | 5 | 5 | U | |
| 563-58-6 | 1,1-DICHLOROPROPENE | 1 | 5 | 5 | U | |
| 107-06-2 | 1,2-DICHLOROETHANE | 1 | 5 | 5 | U | |
| 71-43-2 | BENZENE | 1 | 5 | 5 | U | |
| 79-01-6 | TRICHLOROETHENE | 1 | 5 | 5 | U | |
| 78-87-5 | 1,2-DICHLOROPROPANE | 1 | 5 | 5 | U | |
| 74-95-3 | DIBROMOMETHANE | 1 | 5 | 5 | U | |
| 75-27-4 | BROMODICHLOROMETHANE | 1 | 5 | 5 | U | |
| 10061-01-5 | CIS-1,3-DICHLOROPROPENE | 1 | 5 | 5 | U | |

Data Package ID: *VL0010150-1*

# GC/MS Volatiles

## Method SW8260

## Sample Results

Lab Name: Paragon Analytics, Inc.
Work Order Number: 0010150
Client Name: Los Alamos National Laboratory SMO
ClientProject ID: 7889R

Field ID: GW54-00-0017
Lab ID: 0010150-1

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 16-Oct-00
Date Extracted: 19-Oct-00
Date Analyzed: 19-Oct-00

Prep Batch: VL001019-3
QCBatchID: VL001019-3-2
Run ID: VL001019-3A
Cleanup: NONE
Basis: As Received

Sample Aliquot: 5 ML
Final Volume: 5 ML
Result Units: UG/L
File Name: C6634

| | | | | | | |
|---|---|---|---|---|---|---|
| 108-10-1 | 4-METHYL-2-PENTANONE | 1 | 20 | 20 | U | |
| 108-88-3 | TOLUENE | 1 | 5 | 5 | U | |
| 10061-02-6 | TRANS-1,3-DICHLOROPROPENE | 1 | 5 | 5 | U | |
| 79-00-5 | 1,1,2-TRICHLOROETHANE | 1 | 5 | 5 | U | |
| 591-78-6 | 2-HEXANONE | 1 | 20 | 20 | U | |
| 127-18-4 | TETRACHLOROETHENE | 1 | 5 | 5 | U | |
| 142-28-9 | 1,3-DICHLOROPROPANE | 1 | 5 | 5 | U | |
| 124-48-1 | DIBROMOCHLOROMETHANE | 1 | 5 | 5 | U | |
| 106-93-4 | 1,2-DIBROMOETHANE | 1 | 5 | 5 | U | |
| 108-90-7 | CHLOROBENZENE | 1 | 5 | 5 | U | |
| 630-20-6 | 1,1,1,2-TETRACHLOROETHANE | 1 | 5 | 5 | U | |
| 100-41-4 | ETHYLBENZENE | 1 | 5 | 5 | U | |
| 136777-61-2 | M+P-XYLENE | 1 | 5 | 5 | U | |
| 95-47-6 | O-XYLENE | 1 | 5 | 5 | U | |
| 100-42-5 | STYRENE | 1 | 5 | 5 | U | |
| 75-25-2 | BROMOFORM | 1 | 5 | 5 | U | |
| 98-82-8 | ISOPROPYLBENZENE | 1 | 5 | 5 | U | |
| 96-18-4 | 1,2,3-TRICHLOROPROPANE | 1 | 5 | 5 | U | |
| 79-34-5 | 1,1,2,2-TETRACHLOROETHANE | 1 | 5 | 5 | U | |
| 108-86-1 | BROMOBENZENE | 1 | 5 | 5 | U | |
| 103-65-1 | N-PROPYLBENZENE | 1 | 5 | 5 | U | |
| 95-49-8 | 2-CHLOROTOLUENE | 1 | 5 | 5 | U | |
| 108-67-8 | 1,3,5-TRIMETHYLBENZENE | 1 | 5 | 5 | U | |
| 106-43-4 | 4-CHLOROTOLUENE | 1 | 5 | 5 | U | |
| 98-06-6 | TERT-BUTYLBENZENE | 1 | 5 | 5 | U | |
| 95-63-6 | 1,2,4-TRIMETHYLBENZENE | 1 | 5 | 5 | U | |
| 135-98-8 | SEC-BUTYLBENZENE | 1 | 5 | 5 | U | |
| 541-73-1 | 1,3-DICHLOROBENZENE | 1 | 5 | 5 | U | |
| 99-87-6 | P-ISOPROPYLTOLUENE | 1 | 5 | 5 | U | |
| 106-46-7 | 1,4-DICHLOROBENZENE | 1 | 5 | 5 | U | |
| 104-51-8 | N-BUTYLBENZENE | 1 | 5 | 5 | U | |
| 95-50-1 | 1,2-DICHLOROBENZENE | 1 | 5 | 5 | U | |

Data Package ID: *VL0010150-1*

# GC/MS Volatiles

## Method SW8260

## Sample Results

**Lab Name:** Paragon Analytics, Inc.
**Work Order Number:** 0010150
**Client Name:** Los Alamos National Laboratory SMO
**ClientProject ID:** 7889R

| | | | |
|---|---|---|---|
| **Field ID:** GW54-00-0017 | **Sample Matrix:** WATER | **Prep Batch:** VL001019-3 | **Sample Aliquot:** 5 ML |
| **Lab ID:** 0010150-1 | **% Moisture:** N/A | **QCBatchID:** VL001019-3-2 | **Final Volume:** 5 ML |
| | **Date Collected:** 16-Oct-00 | **Run ID:** VL001019-3A | **Result Units:** UG/L |
| | **Date Extracted:** 19-Oct-00 | **Cleanup:** NONE | |
| | **Date Analyzed:** 19-Oct-00 | **Basis:** As Received | **File Name:** C6634 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | 1 | 10 | 10 | U | |
| 120-82-1 | 1,2,4-TRICHLOROBENZENE | 1 | 5 | 5 | U | |
| 87-68-3 | HEXACHLOROBUTADIENE | 1 | 5 | 5 | U | |
| 91-20-3 | NAPHTHALENE | 1 | 5 | 5 | U | |
| 87-61-6 | 1,2,3-TRICHLOROBENZENE | 1 | 5 | 5 | U | |

## Surrogate Recovery

| CASNO | Surrogate Analyte | Result | Flag | Spike Amount | Percent Recovery | Control Limits |
|---|---|---|---|---|---|---|
| 460-00-4 | 4-BROMOFLUOROBENZENE | 54 | | 50 | 108 | 86 - 115 |
| 1868-53-7 | DIBROMOFLUOROMETHANE | 54.8 | | 50 | 110 | 86 - 118 |
| 2037-26-5 | TOLUENE-D8 | 54.9 | | 50 | 110 | 88 - 110 |

# GC/MS Volatiles

## Method SW8260

## Sample Results

**Lab Name:** Paragon Analytics, Inc.
**Work Order Number:** 0010150
**Client Name:** Los Alamos National Laboratory SMO
**Client Project ID:** 7889R

**Field ID:** GW54-00-0019
**Lab ID:** 0010150-2

**Sample Matrix:** WATER
**% Moisture:** N/A
**Date Collected:** 16-Oct-00
**Date Extracted:** 20-Oct-00
**Date Analyzed:** 20-Oct-00

**Prep Batch:** VL0010020-3
**QCBatchID:** VL0010020-3-1
**Run ID:** VL001020-3A
**Cleanup:** NONE
**Basis:** As Received

**Sample Aliquot:** 5 ML
**Final Volume:** 5 ML
**Result Units:** UG/L
**File Name:** C6653

| CASNO | Target Analyte | Dilution Factor | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|---|---|---|---|---|---|---|
| 75-71-8 | DICHLORODIFLUOROMETHANE | 1 | 10 | 10 | U | |
| 74-87-3 | CHLOROMETHANE | 1 | 10 | 10 | U | |
| 75-01-4 | VINYL CHLORIDE | 1 | 10 | 10 | U | |
| 74-83-9 | BROMOMETHANE | 1 | 10 | 10 | U | |
| 75-00-3 | CHLOROETHANE | 1 | 10 | 10 | U | |
| 75-69-4 | TRICHLOROFLUOROMETHANE | 1 | 5 | 5 | U | |
| 75-35-4 | 1,1-DICHLOROETHENE | 1 | 5 | 5 | U | |
| 76-13-1 | TRICHLOROTRIFLUOROETHANE | 1 | 5 | 5 | U | |
| 67-64-1 | ACETONE | 1 | 610 | 30 | | |
| 74-88-4 | IODOMETHANE | 1 | 5 | 5 | U | |
| 75-15-0 | CARBON DISULFIDE | 1 | 5 | 5 | U | |
| 75-09-2 | METHYLENE CHLORIDE | 1 | 2.5 | 5 | J,B | |
| 156-60-5 | TRANS-1,2-DICHLOROETHENE | 1 | 5 | 5 | U | |
| 75-34-3 | 1,1-DICHLOROETHANE | 1 | 5 | 5 | U | |
| 156-59-2 | CIS-1,2-DICHLOROETHENE | 1 | 5 | 5 | U | |
| 78-93-3 | 2-BUTANONE | 1 | 20 | 20 | U | |
| 74-97-5 | BROMOCHLOROMETHANE | 1 | 5 | 5 | U | |
| 67-66-3 | CHLOROFORM | 1 | 5 | 5 | U | |
| 71-55-6 | 1,1,1-TRICHLOROETHANE | 1 | 5 | 5 | U | |
| 594-20-7 | 2,2-DICHLOROPROPANE | 1 | 5 | 5 | U | |
| 56-23-5 | CARBON TETRACHLORIDE | 1 | 5 | 5 | U | |
| 563-58-6 | 1,1-DICHLOROPROPENE | 1 | 5 | 5 | U | |
| 107-06-2 | 1,2-DICHLOROETHANE | 1 | 5 | 5 | U | |
| 71-43-2 | BENZENE | 1 | 5 | 5 | U | |
| 79-01-6 | TRICHLOROETHENE | 1 | 5 | 5 | U | |
| 78-87-5 | 1,2-DICHLOROPROPANE | 1 | 5 | 5 | U | |
| 74-95-3 | DIBROMOMETHANE | 1 | 5 | 5 | U | |
| 75-27-4 | BROMODICHLOROMETHANE | 1 | 5 | 5 | U | |
| 10061-01-5 | CIS-1,3-DICHLOROPROPENE | 1 | 5 | 5 | U | |

**Data Package ID:** *VL0010150-2*

# GC/MS Volatiles

## Method SW8260

## Sample Results

**Lab Name:** Paragon Analytics, Inc.
**Work Order Number:** 0010150
**Client Name:** Los Alamos National Laboratory SMO
**ClientProject ID:** 7889R

**Field ID:** GW54-00-0019
**Lab ID:** 0010150-2

**Sample Matrix:** WATER
**% Moisture:** N/A
**Date Collected:** 16-Oct-00
**Date Extracted:** 20-Oct-00
**Date Analyzed:** 20-Oct-00

**Prep Batch:** VL0010020-3
**QCBatchID:** VL0010020-3-1
**Run ID:** VL001020-3A
**Cleanup:** NONE
**Basis:** As Received

**Sample Aliquot:** 5 ML
**Final Volume:** 5 ML
**Result Units:** UG/L
**File Name:** C6653

| | | | | | | |
|---|---|---|---|---|---|---|
| 108-10-1 | 4-METHYL-2-PENTANONE | 1 | 20 | 20 | U | |
| 108-88-3 | TOLUENE | 1 | 5 | 5 | U | |
| 10061-02-6 | TRANS-1,3-DICHLOROPROPENE | 1 | 5 | 5 | U | |
| 79-00-5 | 1,1,2-TRICHLOROETHANE | 1 | 5 | 5 | U | |
| 591-78-6 | 2-HEXANONE | 1 | 20 | 20 | U | |
| 127-18-4 | TETRACHLOROETHENE | 1 | 5 | 5 | U | |
| 142-28-9 | 1,3-DICHLOROPROPANE | 1 | 5 | 5 | U | |
| 124-48-1 | DIBROMOCHLOROMETHANE | 1 | 5 | 5 | U | |
| 106-93-4 | 1,2-DIBROMOETHANE | 1 | 5 | 5 | U | |
| 108-90-7 | CHLOROBENZENE | 1 | 5 | 5 | U | |
| 630-20-6 | 1,1,1,2-TETRACHLOROETHANE | 1 | 5 | 5 | U | |
| 100-41-4 | ETHYLBENZENE | 1 | 5 | 5 | U | |
| 136777-61-2 | M+P XYLENE | 1 | 5 | 5 | U | |
| 95-47-6 | O-XYLENE | 1 | 5 | 5 | U | |
| 100-42-5 | STYRENE | 1 | 5 | 5 | U | |
| 75-25-2 | BROMOFORM | 1 | 5 | 5 | U | |
| 98-82-8 | ISOPROPYLBENZENE | 1 | 5 | 5 | U | |
| 96-18-4 | 1,2,3-TRICHLOROPROPANE | 1 | 5 | 5 | U | |
| 79-34-5 | 1,1,2,2-TETRACHLOROETHANE | 1 | 5 | 5 | U | |
| 108-86-1 | BROMOBENZENE | 1 | 5 | 5 | U | |
| 103-65-1 | N-PROPYLBENZENE | 1 | 5 | 5 | U | |
| 95-49-8 | 2-CHLOROTOLUENE | 1 | 5 | 5 | U | |
| 108-67-8 | 1,3,5-TRIMETHYLBENZENE | 1 | 5 | 5 | U | |
| 106-43-4 | 4-CHLOROTOLUENE | 1 | 5 | 5 | U | |
| 98-06-6 | TERT-BUTYLBENZENE | 1 | 5 | 5 | U | |
| 95-63-6 | 1,2,4-TRIMETHYLBENZENE | 1 | 5 | 5 | U | |
| 135-98-8 | SEC-BUTYLBENZENE | 1 | 5 | 5 | U | |
| 541-73-1 | 1,3-DICHLOROBENZENE | 1 | 5 | 5 | U | |
| 99-87-6 | P-ISOPROPYLTOLUENE | 1 | 5 | 5 | U | |
| 106-46-7 | 1,4-DICHLOROBENZENE | 1 | 5 | 5 | U | |
| 104-51-8 | N-BUTYLBENZENE | 1 | 5 | 5 | U | |
| 95-50-1 | 1,2-DICHLOROBENZENE | 1 | 5 | 5 | U | |

**Data Package ID:** *VL0010150-2*

# GC/MS Volatiles

## Method SW8260

## Sample Results

Lab Name: Paragon Analytics, Inc.
Work Order Number: 0010150
Client Name: Los Alamos National Laboratory SMO
ClientProject ID: 7889R

| | | | |
|---|---|---|---|
| Field ID: GW54-00-0019 | Sample Matrix: WATER | Prep Batch: VL0010020-3 | Sample Aliquot: 5 ML |
| Lab ID: 0010150-2 | % Moisture: N/A | QCBatchID: VL0010020-3-1 | Final Volume: 5 ML |
| | Date Collected: 16-Oct-00 | Run ID: VL001020-3A | Result Units: UG/L |
| | Date Extracted: 20-Oct-00 | Cleanup: NONE | |
| | Date Analyzed: 20-Oct-00 | Basis: As Received | File Name: C6653 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | 1 | 10 | 10 | U | |
| 120-82-1 | 1,2,4-TRICHLOROBENZENE | 1 | 5 | 5 | U | |
| 87-68-3 | HEXACHLOROBUTADIENE | 1 | 5 | 5 | U | |
| 91-20-3 | NAPHTHALENE | 1 | 5 | 5 | U | |
| 87-61-0 | 1,2,3-TRICHLOROBENZENE | 1 | 5 | 5 | U | |

## Surrogate Recovery

| CASNO | Surrogate Analyte | Result | Flag | Spike Amount | Percent Recovery | Control Limits |
|---|---|---|---|---|---|---|
| 460-00-4 | 4-BROMOFLUOROBENZENE | 48.8 | | 50 | 98 | 86 - 115 |
| 1868-53-7 | DIBROMOFLUOROMETHANE | 47.1 | | 50 | 94 | 86 - 118 |
| 2037-26-5 | TOLUENE-D8 | 52 | | 50 | 104 | 88 - 110 |

Data Package ID: *VL0010150-2*

# GC/MS Volatiles

## Method SW8260

## Tentatively Identified Compounds

**Lab Name:** Paragon Analytics, Inc.
**Work Order Number:** 0010150
**Client Name:** Los Alamos National Laboratory SMO
**ClientProject ID:** 7589R

| | | | |
|---|---|---|---|
| **Field ID:** GW54-00-0019<br>**Lab ID:** 0010150-2 | **Sample Matrix:** WATER<br>**% Moisture:** N/A<br>**Date Collected:** 10/16/2000<br>**Date Extracted:** 20-Oct-00<br>**Date Analyzed:** 20-Oct-00 | **Prep Batch:** VL0010020-3<br>**QCBatchID:** VL0010020-3-1<br>**Run ID:** VL001020-3A<br>**Cleanup:** NONE<br>**Basis:** As Received | **Sample Aliquot:** 5 ML<br>**Final Volume:** 5 ML |

| Retention Time | Target Analyte | Dilution Factor | Result | Units | Qualifier |
|---|---|---|---|---|---|
| | NONE DETECTED | 1 | | | |

**Data Package ID:** *VL0010150-2*

# GC/MS Volatiles

## Method SW8260

## Tentatively Identified Compounds

**Lab Name:** Paragon Analytics, Inc.
**Work Order Number:** 0010150
**Client Name:** Los Alamos National Laboratory SMO
**ClientProject ID:** 7889R

**Field ID:** GW54-00-0017
**Lab ID:** 0010150-1

**Sample Matrix:** WATER
**% Moisture:** N/A
**Date Collected:** 10/16/2000
**Date Extracted:** 19-Oct-00
**Date Analyzed:** 19-Oct-00

**Prep Batch:** VL001019-3
**QCBatchID:** VL001019-3-2
**Run ID:** VL001019-3A
**Cleanup:** NONE
**Basis:** As Received

**Sample Aliquot:** 5 ML
**Final Volume:** 5 ML

| Retention Time | Target Analyte | Dilution Factor | Result | Units | Qualifier |
|---|---|---|---|---|---|
| | NONE DETECTED | 1 | | | |
| 6.81 | ISOPROPYL ALCOHOL | 1 | 300 | UG/L | J |
| 14.40 | OXYGENATED HYDROCARBON1 | 1 | 11 | UG/L | J |
| 14.56 | SATURATED HYDROCARBON1 | 1 | 32 | UG/L | J |
| 14.64 | SUBSTITUTED NAPHTHALENE1 | 1 | 6.6 | UG/L | J |
| 15.02 | UNKNOWN1 | 1 | 6.2 | UG/L | J |
| 15.40 | UNKNOWN HYDROCARBON1 | 1 | 12 | UG/L | J |
| 15.73 | SATURATED HYDROCARBON2 | 1 | 31 | UG/L | J |
| 16.01 | UNKNOWN HYDROCARBON2 | 1 | 5.1 | UG/L | J |
| 16.19 | UNKNOWN HYDROCARBON3 | 1 | 46 | UG/L | J |
| 17.17 | SATURATED HYDROCARBON3 | 1 | 6.2 | UG/L | J |

**Data Package ID:** *VL0010150-1*

Login #L0010490
November 1, 2000 12:41 pm

**KEMRON ENVIRONMENTAL SERVICES**

**Product: 827LA - Semivolatile Compounds**

Lab Sample ID: L0010490-01
Client Sample ID: GW54-00-0017
Site/Work ID: 7918R/MR1A05509MD0
Matrix: Water

TCLP Extract Date: N/A
Extract Date: 10/23/00
Analysis Date: 10/26/00 Time: 17:22

Dil. Type: N/A
COC Info: 7918R/

Date Collected: 10/16/00

Instrument: HPMS4
Analyst: MDC
Lab File ID: 4M5580

Sample Weight: N/A
Extract Volume: N/A

% Solid: N/A

Method: 8270C\3510C
Run ID: R104992
Batch : WG86454

| CAS # | Compound | Units | Result | Qualifiers | RL | Dilution |
|---|---|---|---|---|---|---|
| 62-75-9 | n-Nitrosodimethylamine | ug/L | | ND | 5.4 | 1.08 |
| 62-53-3 | Aniline | ug/L | | ND | 11 | 1.08 |
| 108-95-2 | Phenol | ug/L | 4.7 | J | 5.4 | 1.08 |
| 111-44-4 | bis(2-Chloroethyl)ether | ug/L | | ND | 5.4 | 1.08 |
| 95-57-8 | 2-Chlorophenol | ug/L | | ND | 5.4 | 1.08 |
| 541-73-1 | 1,3-Dichlorobenzene | ug/L | | ND | 5.4 | 1.08 |
| 106-46-7 | 1,4-Dichlorobenzene | ug/L | | ND | 5.4 | 1.08 |
| 95-50-1 | 1,2-Dichlorobenzene | ug/L | | ND | 5.4 | 1.08 |
| 95-48-7 | 2-Methylphenol | ug/L | | ND | 5.4 | 1.08 |
| 106-44-5 | 3 & 4-Methylphenol | ug/L | | ND | 5.4 | 1.08 |
| 621-64-7 | n-Nitroso-di-n-propylamine | ug/L | | ND | 5.4 | 1.08 |
| 67-72-1 | Hexachloroethane | ug/L | | ND | 5.4 | 1.08 |
| 98-95-3 | Nitrobenzene | ug/L | | ND | 5.4 | 1.08 |
| 78-59-1 | Isophorone | ug/L | | ND | 5.4 | 1.08 |
| 88-75-5 | 2-Nitrophenol | ug/L | | ND | 5.4 | 1.08 |
| 105-67-9 | 2,4-Dimethylphenol | ug/L | | ND | 5.4 | 1.08 |
| 65-85-0 | Benzoic acid | ug/L | | ND | 27 | 1.08 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ug/L | | ND | 5.4 | 1.08 |
| 120-83-2 | 2,4-Dichlorophenol | ug/L | | ND | 5.4 | 1.08 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ug/L | | ND | 5.4 | 1.08 |
| 91-20-3 | Naphthalene | ug/L | | ND | 5.4 | 1.08 |
| 106-47-8 | 4-Chloroaniline | ug/L | | ND | 11 | 1.08 |
| 87-68-3 | Hexachlorobutadiene | ug/L | | ND | 5.4 | 1.08 |
| 59-50-7 | 4-Chloro-3-methylphenol | ug/L | | ND | 11 | 1.08 |
| 91-57-6 | 2-Methylnaphthalene | ug/L | | ND | 5.4 | 1.08 |
| 77-47-4 | Hexachlorocyclopentadiene | ug/L | | ND | 5.4 | 1.08 |
| 88-06-2 | 2,4,6-Trichlorophenol | ug/L | | ND | 5.4 | 1.08 |
| 95-95-4 | 2,4,5-Trichlorophenol | ug/L | | ND | 27 | 1.08 |
| 91-58-7 | 2-Chloronaphthalene | ug/L | | ND | 5.4 | 1.08 |
| 88-74-4 | 2-Nitroaniline | ug/L | | ND | 27 | 1.08 |
| 131-11-3 | Dimethylphthalate | ug/L | | ND | 5.4 | 1.08 |
| 208-96-8 | Acenaphthylene | ug/L | | ND | 5.4 | 1.08 |
| 99-09-2 | 3-Nitroaniline | ug/L | | ND | 27 | 1.08 |
| 83-32-9 | Acenaphthene | ug/L | | ND | 5.4 | 1.08 |
| 51-28-5 | 2,4-Dinitrophenol | ug/L | | ND | 27 | 1.08 |
| 100-02-7 | 4-Nitrophenol | ug/L | | ND | 27 | 1.08 |
| 132-64-9 | Dibenzofuran | ug/L | | ND | 5.4 | 1.08 |
| 121-14-2 | 2,4-Dinitrotoluene | ug/L | | ND | 5.4 | 1.08 |
| 606-20-2 | 2,6-Dinitrotoluene | ug/L | | ND | 5.4 | 1.08 |

RL = Reporting Limit

Login #L0010490
November 1, 2000 12:41 pm

**KEMRON ENVIRONMENTAL SERVICES**

**Product: 827LA - Semivolatile Compounds**

Lab Sample ID: L0010490-01
Client Sample ID: GW54-00-0017
Site/Work ID: 7918R/MR1A05509MD0
Matrix: Water

TCLP Extract Date: N/A
Extract Date: 10/23/00
Analysis Date: 10/26/00 Time: 17:22

Dil. Type: N/A
COC Info: 7918R/

Date Collected: 10/16/00

Instrument: HPMS4
Analyst: MDC
Lab File ID: 4M5580

Sample Weight: N/A
Extract Volume: N/A

% Solid: N/A

Method: 8270C\3510C
Run ID: R104992
Batch : WG86454

| CAS # | Compound | Units | Result | Qualifiers | RL | Dilution |
|---|---|---|---|---|---|---|
| 84-66-2 | Diethylphthalate | ug/L | | ND | 5.4 | 1.08 |
| 7005-72-3 | 4-Chlorophenyl-phenyl ether | ug/L | | ND | 5.4 | 1.08 |
| 86-73-7 | Fluorene | ug/L | | ND | 5.4 | 1.08 |
| 100-01-6 | 4-Nitroaniline | ug/L | | ND | 11 | 1.08 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ug/L | | ND | 27 | 1.08 |
| 86-30-6 | n-Nitrosodiphenylamine | ug/L | | ND | 5.4 | 1.08 |
| 103-33-3 | Azobenzene | ug/L | | ND | 11 | 1.08 |
| 101-55-3 | 4-Bromophenyl-phenylether | ug/L | | ND | 5.4 | 1.08 |
| 118-74-1 | Hexachlorobenzene | ug/L | | ND | 5.4 | 1.08 |
| 87-86-5 | Pentachlorophenol | ug/L | | ND | 27 | 1.08 |
| 85-01-8 | Phenanthrene | ug/L | | ND | 5.4 | 1.08 |
| 120-12-7 | Anthracene | ug/L | | ND | 5.4 | 1.08 |
| 84-74-2 | Di-n-butylphthalate | ug/L | | ND | 5.4 | 1.08 |
| 206-44-0 | Fluoranthene | ug/L | | ND | 5.4 | 1.08 |
| 129-00-0 | Pyrene | ug/L | | ND | 5.4 | 1.08 |
| 85-68-7 | Butylbenzylphthalate | ug/L | | ND | 5.4 | 1.08 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ug/L | | ND | 11 | 1.08 |
| 56-55-3 | Benzo(a)anthracene | ug/L | | ND | 5.4 | 1.08 |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ug/L | | ND | 5.4 | 1.08 |
| 218-01-9 | Chrysene | ug/L | | ND | 5.4 | 1.08 |
| 117-84-0 | Di-n-octylphthalate | ug/L | | ND | 5.4 | 1.08 |
| 205-99-2 | Benzo(b)fluoranthene | ug/L | | ND | 5.4 | 1.08 |
| 207-08-9 | Benzo(k)fluoranthene | ug/L | | ND | 5.4 | 1.08 |
| 50-32-8 | Benzo(a)pyrene | ug/L | | ND | 5.4 | 1.08 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ug/L | | ND | 5.4 | 1.08 |
| 53-70-3 | Dibenzo(a,h)anthracene | ug/L | | ND | 5.4 | 1.08 |
| 191-24-2 | Benzo(g,h,i)Perylene | ug/L | | ND | 5.4 | 1.08 |
| 100-51-6 | Benzyl alcohol | ug/L | | ND | 11 | 1.08 |
| 108-60-1 | 2,2'-Oxybis(1-chloropropane) | ug/L | | ND | 5.4 | 1.08 |

**SURROGATES- In Percent Recovery:**

| | | | |
|---|---|---|---|
| 2,4,6-Tribromophenol | 55.1 | | ( 10 - 123%) |
| 2-Fluorobiphenyl | 20.8 | * | ( 43 - 116%) |
| 2-Fluorophenol | 32.1 | | ( 21 - 100%) |
| Nitrobenzene-d5 | 77.3 | | ( 35 - 114%) |
| Phenol-d5 | 23.0 | | ( 10 - 94%) |
| p-Terphenyl-d14 | 9.96 | * | ( 33 - 141%) |

RL = Reporting Limit

Login #L0010490
November 1, 2000 12:41 pm

**KEMRON ENVIRONMENTAL SERVICES**

**Product: 827-LS - Library Search - BNA**

Lab Sample ID: L0010490-02
Client Sample ID: GW54-00-0019
Site/Work ID: 7918R/MR1A05509MD0
Matrix: Water

TCLP Extract Date: N/A
Extract Date: 10/23/00
Analysis Date: 10/26/00 Time: 17:56

Dil. Type: N/A
COC Info: 7918R/

Date Collected: 10/16/00

Instrument: HPMS4
Analyst: MDC
Lab File ID: 4M5581

Sample Weight: N/A
Extract Volume: N/A

% Solid: N/A

Method: 8270C\3510C
Run ID: R104992
Batch : WG86454

| CAS # | Compound | Units | Result | Qualifiers | RL | Ret Time |
|---|---|---|---|---|---|---|
| R01R1 | unknown27 | ug/L | 6.86 | | | 9.95 |
| 017301-23-4 | Undecane, 2,6-dimethyl- | ug/L | 17.6 | | | 10.03 |
| 054676-39-0 | Cyclohexane, 2-butyl-1,1,3-trimethyl- | ug/L | 5.25 | | | 10.25 |
| R01R1 | unknown28 | ug/L | 4.32 | | | 10.27 |
| 066660-43-3 | trans, cis-3-Ethylbicyclo[4.4.0]decane | ug/L | 4.41 | | | 10.35 |
| R01R1 | unknown29 | ug/L | 23.9 | | | 10.39 |
| R01R1 | unknown30 | ug/L | 7.31 | | | 10.43 |
| 000629-50-5 | Tridecane | ug/L | 15.3 | | | 10.56 |
| R01R1 | unknown31 | ug/L | 4.60 | | | 10.62 |
| R01R1 | unknown32 | ug/L | 7.97 | | | 10.66 |
| R01R1 | unknown33 | ug/L | 6.79 | | | 10.85 |
| R01R1 | unknown34 | ug/L | 5.77 | | | 10.93 |
| 003891-98-3 | Dodecane, 2,6,10-trimethyl- | ug/L | 8.26 | | | 11 |
| R01R1 | unknown35 | ug/L | 13.4 | | | 14.57 |
| R01R1 | unknown36 | ug/L | 5.70 | | | 15.34 |
| R01R1 | unknown37 | ug/L | 7.22 | | | 15.36 |
| R01R1 | unknown38 | ug/L | 8.12 | | | 15.51 |
| R01R1 | unknown39 | ug/L | 5.36 | | | 16.62 |
| R01R1 | unknown40 | ug/L | 4.53 | | | 17.73 |

RL = Reporting Limit

Login #L0010490
November 1, 2000 12:41 pm

**KEMRON ENVIRONMENTAL SERVICES**

**Product: 827LA - Semivolatile Compounds**

Lab Sample ID: L0010490-02
Client Sample ID: GW54-00-0019
Site/Work ID: 7918R/MR1A05509MD0
Matrix: Water

TCLP Extract Date: N/A
Extract Date: 10/23/00
Analysis Date: 10/26/00 Time: 17:56

Dil. Type: N/A
COC Info: 7918R/

Date Collected: 10/16/00

Instrument: HPMS4
Analyst: MDC
Lab File ID: 4M5581

Sample Weight: N/A
Extract Volume: N/A

% Solid: N/A

Method: 8270C\3510C
Run ID: R104992
Batch : WG86454

| CAS # | Compound | Units | Result | Qualifiers | RL | Dilution |
|---|---|---|---|---|---|---|
| 62-75-9 | n-Nitrosodimethylamine | ug/L | | ND | 5.0 | 1 |
| 62-53-3 | Aniline | ug/L | | ND | 10 | 1 |
| 108-95-2 | Phenol | ug/L | | ND | 5.0 | 1 |
| 111-44-4 | bis(2-Chloroethyl)ether | ug/L | | ND | 5.0 | 1 |
| 95-57-8 | 2-Chlorophenol | ug/L | | ND | 5.0 | 1 |
| 541-73-1 | 1,3-Dichlorobenzene | ug/L | | ND | 5.0 | 1 |
| 106-46-7 | 1,4-Dichlorobenzene | ug/L | | ND | 5.0 | 1 |
| 95-50-1 | 1,2-Dichlorobenzene | ug/L | | ND | 5.0 | 1 |
| 95-48-7 | 2-Methylphenol | ug/L | | ND | 5.0 | 1 |
| 106-44-5 | 3 & 4-Methylphenol | ug/L | | ND | 5.0 | 1 |
| 621-64-7 | n-Nitroso-di-n-propylamine | ug/L | | ND | 5.0 | 1 |
| 67-72-1 | Hexachloroethane | ug/L | | ND | 5.0 | 1 |
| 98-95-3 | Nitrobenzene | ug/L | | ND | 5.0 | 1 |
| 78-59-1 | Isophorone | ug/L | | ND | 5.0 | 1 |
| 88-75-5 | 2-Nitrophenol | ug/L | | ND | 5.0 | 1 |
| 105-67-9 | 2,4-Dimethylphenol | ug/L | | ND | 25 | 1 |
| 65-85-0 | Benzoic acid | ug/L | | ND | 5.0 | 1 |
| 111-91-1 | bis(2-Chloroethoxy)methane | ug/L | | ND | 5.0 | 1 |
| 120-83-2 | 2,4-Dichlorophenol | ug/L | | ND | 5.0 | 1 |
| 120-82-1 | 1,2,4-Trichlorobenzene | ug/L | | ND | 5.0 | 1 |
| 91-20-3 | Naphthalene | ug/L | | ND | 10 | 1 |
| 106-47-8 | 4-Chloroaniline | ug/L | | ND | 5.0 | 1 |
| 87-68-3 | Hexachlorobutadiene | ug/L | | ND | 10 | 1 |
| 59-50-7 | 4-Chloro-3-methylphenol | ug/L | | ND | 5.0 | 1 |
| 91-57-6 | 2-Methylnaphthalene | ug/L | | ND | 5.0 | 1 |
| 77-47-4 | Hexachlorocyclopentadiene | ug/L | | ND | 5.0 | 1 |
| 88-06-2 | 2,4,6-Trichlorophenol | ug/L | | ND | 25 | 1 |
| 95-95-4 | 2,4,5-Trichlorophenol | ug/L | | ND | 5.0 | 1 |
| 91-58-7 | 2-Chloronaphthalene | ug/L | | ND | 25 | 1 |
| 88-74-4 | 2-Nitroaniline | ug/L | | ND | 5.0 | 1 |
| 131-11-3 | Dimethylphthalate | ug/L | | ND | 5.0 | 1 |
| 208-96-8 | Acenaphthylene | ug/L | | ND | 25 | 1 |
| 99-09-2 | 3-Nitroaniline | ug/L | | ND | 5.0 | 1 |
| 83-32-9 | Acenaphthene | ug/L | | ND | 25 | 1 |
| 51-28-5 | 2,4-Dinitrophenol | ug/L | | ND | 25 | 1 |
| 100-02-7 | 4-Nitrophenol | ug/L | | ND | 5.0 | 1 |
| 132-64-9 | Dibenzofuran | ug/L | | ND | 5.0 | 1 |
| 121-14-2 | 2,4-Dinitrotoluene | ug/L | | ND | 5.0 | 1 |
| 606-20-2 | 2,6-Dinitrotoluene | ug/L | | ND | 5.0 | 1 |

RL = Reporting Limit

Login #L0010490
November 1, 2000 12:41 pm

**KEMRON ENVIRONMENTAL SERVICES**

**Product: 827LA - Semivolatile Compounds**

Lab Sample ID: L0010490-02
Client Sample ID: GW54-00-0019
Site/Work ID: 7918R/MR1A05509MD0
Matrix: Water

TCLP Extract Date: N/A
Extract Date: 10/23/00
Analysis Date: 10/26/00 Time: 17:56

Dil. Type: N/A
COC Info: 7918R/

Date Collected: 10/16/00

Instrument: HPMS4
Analyst: MDC
Lab File ID: 4M5581

Sample Weight: N/A
Extract Volume: N/A

% Solid: N/A

Method: 8270C\3510C
Run ID: R104992
Batch : WG86454

| CAS # | Compound | Units | Result | Qualifiers | RL | Dilution |
|---|---|---|---|---|---|---|
| 84-66-2 | Diethylphthalate | ug/L | | ND | 5.0 | 1 |
| 7005-72-3 | 4-Chlorophenyl-phenyl ether | ug/L | | ND | 5.0 | 1 |
| 86-73-7 | Fluorene | ug/L | | ND | 5.0 | 1 |
| 100-01-6 | 4-Nitroaniline | ug/L | | ND | 10 | 1 |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | ug/L | | ND | 25 | 1 |
| 86-30-6 | n-Nitrosodiphenylamine | ug/L | | ND | 5.0 | 1 |
| 103-33-3 | Azobenzene | ug/L | | ND | 10 | 1 |
| 101-55-3 | 4-Bromophenyl-phenylether | ug/L | | ND | 5.0 | 1 |
| 118-74-1 | Hexachlorobenzene | ug/L | | ND | 5.0 | 1 |
| 87-86-5 | Pentachlorophenol | ug/L | | ND | 25 | 1 |
| 85-01-8 | Phenanthrene | ug/L | | ND | 5.0 | 1 |
| 120-12-7 | Anthracene | ug/L | | ND | 5.0 | 1 |
| 84-74-2 | Di-n-butylphthalate | ug/L | | ND | 5.0 | 1 |
| 206-44-0 | Fluoranthene | ug/L | | ND | 5.0 | 1 |
| 129-00-0 | Pyrene | ug/L | | ND | 5.0 | 1 |
| 85-68-7 | Butylbenzylphthalate | ug/L | | ND | 5.0 | 1 |
| 91-94-1 | 3,3'-Dichlorobenzidine | ug/L | | ND | 10 | 1 |
| 56-55-3 | Benzo(a)anthracene | ug/L | | ND | 5.0 | 1 |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ug/L | | ND | 5.0 | 1 |
| 218-01-9 | Chrysene | ug/L | | ND | 5.0 | 1 |
| 117-84-0 | Di-n-octylphthalate | ug/L | | ND | 5.0 | 1 |
| 205-99-2 | Benzo(b)fluoranthene | ug/L | | ND | 5.0 | 1 |
| 207-08-9 | Benzo(k)fluoranthene | ug/L | | ND | 5.0 | 1 |
| 50-32-8 | Benzo(a)pyrene | ug/L | | ND | 5.0 | 1 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ug/L | | ND | 5.0 | 1 |
| 53-70-3 | Dibenzo(a,h)anthracene | ug/L | | ND | 5.0 | 1 |
| 191-24-2 | Benzo(g,h,i)Perylene | ug/L | | ND | 5.0 | 1 |
| 100-51-6 | Benzyl alcohol | ug/L | | ND | 10 | 1 |
| 108-60-1 | 2,2'-Oxybis(1-chloropropane) | ug/L | | ND | 5.0 | 1 |

**SURROGATES- In Percent Recovery:**

| | | | |
|---|---|---|---|
| 2,4,6-Tribromophenol | 52.2 | | ( 10 - 123%) |
| 2-Fluorobiphenyl | 45.0 | | ( 43 - 116%) |
| 2-Fluorophenol | 19.3 | * | ( 21 - 100%) |
| Nitrobenzene-d5 | 51.9 | | ( 35 - 114%) |
| Phenol-d5 | 14.0 | | ( 10 - 94%) |
| p-Terphenyl-d14 | 45.0 | | ( 33 - 141%) |

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Login #L0010443
November 13, 2000 11:49 am

Lab Sample ID: L0010443-01
Client Sample ID: GW54-00-0018
Site/Work ID: 7894R/MR1A05509MD0

Matrix: Water
Collected: 10/16/00 00:00

COC Info: 7894R/

| Analyte | Units | Result | Qualifiers | RL | Dil | Type | Analyst | Analysis Date | Time | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Silver, Total | ug/L | 1.6 | B | 10 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Aluminum, Total | ug/L | 1800 | | 100 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Arsenic, Total | ug/L | | U | 4.0 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Barium, Total | ug/L | 220 | | 10 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Beryllium, Total | ug/L | 1.6 | B | 4.0 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Calcium, Total | ug/L | 42000 | | 200 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Cadmium, Total | ug/L | 0.83 | B | 5.0 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Cobalt, Total | ug/L | 9.6 | B | 20 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Chromium, Total | ug/L | 7.2 | B | 10 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Copper, Total | ug/L | 140 | | 20 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Iron, Total | ug/L | 1600 | | 40 | 1 | N/A | AMT | 10/25/00 | 11:36 | 7470A\7470A |
| Mercury, Total | ug/L | | U | 0.20 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Potassium, Total | ug/L | 3200 | | 1000 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Magnesium, Total | ug/L | 8900 | | 500 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Manganese, Total | ug/L | 960 | | 10 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Sodium, Total | ug/L | 9700 | | 500 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Nickel, Total | ug/L | 100 | | 40 | 1 | N/A | JYH | 10/31/00 | 12:41 | 6020A\3015 |
| Lead, Total | ug/L | 7.15 | | 1.0 | 1 | N/A | JYH | 10/31/00 | 12:41 | 6020A\3015 |
| Antimony, Total | ug/L | 0.725 | B | 1.0 | 1 | N/A | JYH | 10/31/00 | 12:41 | 6020A\3015 |
| Selenium, Total | ug/L | 1.17 | | 1.0 | 1 | N/A | JYH | 10/31/00 | 12:41 | 6020A\3015 |
| Thallium, Total | ug/L | 0.188 | B | 0.20 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Vanadium, Total | ug/L | | U | 10 | 1 | N/A | KHR | 10/26/00 | 10:10 | 6010B\3005A |
| Zinc, Total | ug/L | 65 | | 20 | 1 | | | | | |

Lab Sample ID: L0010443-02
Client Sample ID: GW54-00-0020
Site/Work ID: 7894R/MR1A05509MD0

Matrix: Water
Collected: 10/17/00 00:00

COC Info: 7894R/

| Analyte | Units | Result | Qualifiers | RL | Dil | Type | Analyst | Analysis Date | Time | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Silver, Total | ug/L | 1.1 | B | 10 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Aluminum, Total | ug/L | 160 | | 100 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Arsenic, Total | ug/L | | U | 4.0 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Barium, Total | ug/L | 42 | | 10 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Beryllium, Total | ug/L | 0.11 | B | 4.0 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Calcium, Total | ug/L | 18000 | | 200 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Cadmium, Total | ug/L | 0.40 | B | 5.0 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Cobalt, Total | ug/L | | U | 20 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |
| Chromium, Total | ug/L | 4.4 | B | 10 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005 |

RL = Reporting Limit

Login #L0010443
November 13, 2000 11:49 am

# KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L0010443-02
Client Sample ID: GW54-00-0020
Site/Work ID: 7894R/MR1A05509MD0

Matrix: Water
Collected: 10/17/00 00:00

COC Info: 7894R/

| Analyte | Units | Result | Qualifiers | RL | Dil | Type | Analyst | Analysis Date | Time | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Copper, Total | ug/L | 29 | | 20 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Iron, Total | ug/L | 180 | | 40 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Mercury, Total | ug/L | | U | 0.20 | 1 | N/A | AMT | 10/25/00 | 11:36 | 7470A\7470A |
| Potassium, Total | ug/L | 2100 | | 1000 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Magnesium, Total | ug/L | 4700 | | 500 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Manganese, Total | ug/L | 170 | | 10 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Sodium, Total | ug/L | 8900 | | 500 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Nickel, Total | ug/L | | U | 40 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Lead, Total | ug/L | 1.34 | | 1.0 | 1 | N/A | JYH | 10/31/00 | 12:51 | 6020A\3015 |
| Antimony, Total | ug/L | 0.358 | B | 1.0 | 1 | N/A | JYH | 10/31/00 | 12:51 | 6020A\3015 |
| Selenium, Total | ug/L | 1.11 | | 1.0 | 1 | N/A | JYH | 10/31/00 | 12:51 | 6020A\3015 |
| Thallium, Total | ug/L | 0.0352 | B | 0.20 | 1 | N/A | JYH | 10/31/00 | 12:51 | 6020A\3015 |
| Vanadium, Total | ug/L | | U | 10 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |
| Zinc, Total | ug/L | 55 | | 20 | 1 | N/A | KHR | 10/26/00 | 10:19 | 6010B\3005A |

RL - Reporting Limit

# Sample Results Summary

Client Name: Los Alamos National Laboratory SMO
Client Project Name:
Client Project Number: 7892R

Laboratory Name: Paragon Analytics, Inc.
PAI Work Order: 0010152

Page: 1 of 1
Reported on: Tuesday, October 24, 2000 13:36:30

| Lab Sample ID | Client Sample ID | Test | Nuclide | Result +/- 2 s TPU | MDC | Units | Matrix | Prep Batch | Date Analyzed | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| 0010152-1 | GW54-00-0017 | TRITIUM | H-3 | -60 +/- 160 | 270 | pCi/l | Water | LS00562 | 10/23/2000 | U |
| 0010152-2 | GW54-00-0019 | TRITIUM | H-3 | -30 +/- 160 | 270 | pCi/l | Water | LS00562 | 10/23/2000 | U |

**Comments:**

**Data Package ID:** *H3W0010152-1*

Qualifiers/Flags:
J - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y2 - Chemical Yield outside default limits.

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

# GENERAL ENGINEERING LABORATORIES

*Meeting today's needs with a vision for tomorrow.*

## Certificate of Analysis

Company : Los Alamos National Laboratory
Address : PO Box 1663
TA-3, Bldg. 271, Drop Pt. 01U
Los Alamos, NM 87545
Contact: Stephanie MS-H865
Project: 14279-001-00-21

Report Date: November 20, 2000

Page 1 of 1

Client Sample ID: GW54-00-0017
Sample ID: 32936001
Matrix: Ground Water
Collect Date: 16-OCT-00
Receive Date: 19-OCT-00
Collector: Client

Project: LANL00199
Client ID: LANL001

| Parameter | Qualifier | Result | DL | RL | Units | DF | Analyst | Date | Time | Batch | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography Federal** | | | | | | | | | | | |
| *EPA 300.0 Oxalate Liquid Feder* | | | | | | | | | | | |
| Oxalate | U | ND | 0.113 | 0.600 | mg/L | 1 | RWS | 11/15/00 | 1151 | 53511 | 1 |
| *EPA 314.0 Perchlorate by IC* | | | | | | | | | | | |
| Perchlorate | J | 3.16 | 1.04 | 4.00 | ug/L | 1 | RWS | 11/02/00 | 1449 | 51610 | 2 |
| Bromide | U | ND | 0.016 | 0.050 | mg/L | 1 | RWS | 11/01/00 | 1456 | 51477 | 3 |
| Chloride | | 15.6 | 0.026 | 0.100 | mg/L | 1 | | | | | |
| Fluoride | | 0.577 | 0.017 | 0.050 | mg/L | 1 | | | | | |
| Sulfate | | 7.00 | 0.079 | 0.200 | mg/L | 1 | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 300.0 |
| 2 | EPA 314.0 |
| 3 | EPA 300.0 |

Notes:
The Qualifiers in this report are defined as follows :

- * Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
- ** Indicates the analyte is a surrogate compound.
- < Actual result is less than amount reported
- > Actual result is greater than amount reported
- J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
- U Indicates the compound was analyzed for but not detected above the detection limit

The above sample is reported on an "as received" basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Edie M. Kent at 843-769-7385 Ext. .

Reviewed by

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

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# GENERAL ENGINEERING LABORATORIES

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## Certificate of Analysis

Company : Los Alamos National Laboratory
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TA-3, Bldg. 271, Drop Pt. 01U
Los Alamos, NM 87545
Contact: Stephanie MS-H865
Project: 14279-001-00-2I

Report Date: November 20, 2000

Page 1 of 1

Client Sample ID: GW54-00-0019
Sample ID: 32936002
Matrix: Ground Water
Collect Date: 16-OCT-00
Receive Date: 19-OCT-00
Collector: Client

Project: LANL00199
Client ID: LANL001

| Parameter | Qualifier | Result | DL | RL | Units | DF | Analyst | Date | Time | Batch | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ion Chromatography Federal** | | | | | | | | | | | |
| *EPA 300.0 Oxalate Liquid Feder* | | | | | | | | | | | |
| Oxalate | U | ND | 0.113 | 0.600 | mg/L | 1 | RWS | 11/15/00 | 1212 | 53511 | 1 |
| *EPA 314.0 Perchlorate by IC* | | | | | | | | | | | |
| Perchlorate | J | 2.42 | 1.04 | 4.00 | ug/L | 1 | RWS | 11/02/00 | 1458 | 51610 | 2 |
| Bromide | | 0.360 | 0.016 | 0.050 | mg/L | 1 | RWS | 11/01/00 | 1539 | 51477 | 3 |
| Chloride | | 4.14 | 0.026 | 0.100 | mg/L | 1 | | | | | |
| Fluoride | | 0.343 | 0.017 | 0.050 | mg/L | 1 | | | | | |
| Sulfate | | 5.62 | 0.079 | 0.200 | mg/L | 1 | | | | | |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EPA 300.0 |
| 2 | EPA 314.0 |
| 3 | EPA 300.0 |

Notes:
The Qualifiers in this report are defined as follows :

- * Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
- ** Indicates the analyte is a surrogate compound.
- < Actual result is less than amount reported
- > Actual result is greater than amount reported
- J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

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(843) 556-8171 • Fax (843) 766-1178

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# HPLC Explosives

## Method SW8330

## Sample Results

Lab Name: Paragon Analytics, Inc.
Work Order Number: 0010149
Client Name: Los Alamos National Laboratory SMO
ClientProject ID: 7890R

GW54-00-0017
0010149-1

Sample Matrix: WATER
% Moisture: N/A
Date Collected: 16-Oct-00
Date Extracted: 19-Oct-00
Date Analyzed: 23-Oct-00

Prep Batch: EX001019-5
QCBatchID: EX001019-5-1
Run ID: HP001023-41
Cleanup: NONE
Basis: As Received

Sample Aliquot: 350 ML
Final Volume: 3 ML
Result Units: UG/L
File Name: H1023D07

| CASNO | Target Analyte | Dilution Factor | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|---|---|---|---|---|---|---|
| 2691-41-0 | HMX | 1 | 1 | 1 | U | |
| 121-82-4 | RDX | 1 | 0.8 | 0.84 | J | |
| 99-35-4 | 1,3,5-TRINITROBENZENE | 1 | 0.26 | 0.26 | U | |
| 99-65-0 | 1,3-DINITROBENZENE | 1 | 0.25 | 0.25 | U | |
| 479-45-8 | TETRYL | 1 | 0.58 | 1 | J | |
| 98-95-3 | NITROBENZENE | 1 | 1 | 1 | U | |
| 118-96-7 | 2,4,6-TRINITROTOLUENE | 1 | 0.25 | 0.25 | U | |
| 19406-51-0 | 4-AMINO-2,6-DNT | 1 | 0.25 | 0.25 | U | |
| 35572-78-2 | 2-AMINO-4,6-DNT | 1 | 0.077 | 0.25 | J | |
| 606-20-2 | 2,6-DINITROTOLUENE | 1 | 0.061 | 0.25 | J | |
| 121-14-2 | 2,4-DINITROTOLUENE | 1 | 0.25 | 0.25 | U | |
| 88-72-2 | 2-NITROTOLUENE | 1 | 1 | 1 | U | |
| 99-99-0 | 4-NITROTOLUENE | 1 | 1 | 1 | U | |
| 99-08-1 | 3-NITROTOLUENE | 1 | 1 | 1 | U | |

## Surrogate Recovery

| CASNO | Surrogate Analyte | Result | Flag | Spike Amount | Percent Recovery | Control Limits |
|---|---|---|---|---|---|---|
| 100-25-4 | 1,4-DINITROBENZENE | 1.08 | | 2.14 | 51 | 36 - 111 |

Data Package ID: *HP0010149-1*

# HPLC Explosives

## Method SW8330

## Sample Results

**Lab Name:** Paragon Analytics, Inc.
**Work Order Number:** 0010149
**Client Name:** Los Alamos National Laboratory SMO
**ClientProject ID:** 7890R

| | | | |
|---|---|---|---|
| GW54-00-0019 | Sample Matrix: WATER | Prep Batch: EX001019-5 | Sample Aliquot: 350 ML |
| 0010149-2 | % Moisture: N/A | QCBatchID: EX001019-5-1 | Final Volume: 3 ML |
| | Date Collected: 16-Oct-00 | Run ID: HP001023-41 | Result Units: UG/L |
| | Date Extracted: 19-Oct-00 | Cleanup: NONE | |
| | Date Analyzed: 23-Oct-00 | Basis: As Received | File Name: H1023D08 |

| CASNO | Target Analyte | Dilution Factor | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|---|---|---|---|---|---|---|
| 2691-41-0 | HMX | 1 | 1 | 1 | U | |
| 121-82-4 | RDX | 1 | 0.84 | 0.84 | U | |
| 99-35-4 | 1,3,5-TRINITROBENZENE | 1 | 0.26 | 0.26 | U | |
| 99-65-0 | 1,3-DINITROBENZENE | 1 | 0.25 | 0.25 | U | |
| 479-45-8 | TETRYL | 1 | 1 | 1 | U | |
| 98-95-3 | NITROBENZENE | 1 | 1 | 1 | U | |
| 118-96-7 | 2,4,6-TRINITROTOLUENE | 1 | 0.049 | 0.25 | J | |
| 19406-51-0 | 4-AMINO-2,6-DNT | 1 | 0.25 | 0.25 | U | |
| 35572-78-2 | 2-AMINO-4,6-DNT | 1 | 0.25 | 0.25 | U | |
| 606-20-2 | 2,6-DINITROTOLUENE | 1 | 0.25 | 0.25 | U | |
| 121-14-2 | 2,4-DINITROTOLUENE | 1 | 0.25 | 0.25 | U | |
| 88-72-2 | 2-NITROTOLUENE | 1 | 1 | 1 | U | |
| 99-99-0 | 4-NITROTOLUENE | 1 | 1 | 1 | U | |
| 99-08-1 | 3-NITROTOLUENE | 1 | 1 | 1 | U | |

## Surrogate Recovery

| CASNO | Surrogate Analyte | Result | Flag | Spike Amount | Percent Recovery | Control Limits |
|---|---|---|---|---|---|---|
| 100-25-4 | 1,4-DINITROBENZENE | 1.85 | | 2.14 | 86 | 36 - 111 |

**Data Package ID:** *HP0010149-1*

ENCLOSURE 3

# CONFIRMATION SAMPLING REPORT FOR R-22 DEEP WELL

Date

November 28, 2000

## 1.0 Introduction

This report presents the results of confirmation sampling activities at the R-22 deep well. The purpose of collecting confirmation samples was the suspected presence of acetone identified in the storage tanks (FRAC) after completion of the drilling activities. These samples were taken to confirm the presence and identify the source of the acetone.

### 1.1 Previous Collection Activities

On October 16th, 2000 water samples were taken from the injection water (water used during well drilling), the two Frac-tanks (tanks used to store the water produced during well drilling) and a trip blank. The results are presented in Table 1-1.

**Table 1-1**
**Summary of Results**

| Sample ID | Sample Description | Acetone Concentration (ug/L) |
|---|---|---|
| GW54-00-0017 | Northern most Frac Tank | 1700 # |
| GW54-00-0019 | Frac Tank – 370 | 610 |
| GW54-00-0021 | Injection water | 1500 # |
| GW54-00-0021RR | Injection water re-analysis | 2100 # |
| GW54-00-0022 | Trip Blank | 58 |

RR = re-analysis
# = Suspected false positive due to isopropyl alcohol

The data received were faxed results from the laboratory. It was identified that the largest concentration of acetone was found in the injection water. The following corrective actions were performed.

1. The GC/MS mass spectrums were requested from the analytical laboratory for the initial findings. These were received on November 7th, 2000.
2. The distributors of the EZ-Mud Plus and the Quik-Foam (Baroid) were contacted. Baroid stated that acetone was not used in any process to produce their products.
3. From these preliminary results, a sampling analysis plan (SAP) was written to confirm the potential source of the acetone.

### 1.2 Confirmation Sampling

The following additional samples were taken. These were taken on November 2, 2000.

- Two samples were taken from the water source. This was determined to be a fire hydrant just outside the TA-54 entrance gate. One sample was taken immediately after opening the valve and one taken after five minutes of purging.
- One sample was taken from the truck used to haul and store the water during drilling activities.
- One sample was taken of the Baroid EZ-Mud Plus that is used during drilling.
- One sample was taken of the Baroid Quik-Foam that is used during drilling.
- One sample was taken from each of the 2 additional Frac-tanks that had not been previously sampled.
- One sample was taken from a Frac-tank at a different drilling site (R-25) to be used as a background sample for the Frac-tanks.

The sampling was accompanied with a series of blanks to measure potential background or laboratory contamination concentrations.

- Blank water was prepared prior the sampling by using distilled water that was heated to a temperature of 85 degrees C while purging with nitrogen for 1 hour.

- One blank was sealed and designated as the Source Blank water.
- One blank was designated as a sampling blank and opened during each sampling event.
- One blank was designated as a laboratory storage blank and opened in the lab storage area while sample were being stored awaiting analysis.
- One blank was designated as an analysis blank and opened in the analytical laboratory during the analysis of the samples.

## 1.3 Confirmation Sampling Results

The results of the confirmation sampes are presented in Table 1-2.

**Table 1-2**
**Summary of Results**

| Sample ID | Sample Description | Acetone Concentration (ug/L) |
|---|---|---|
| GW54-00-0031 | Source Trip Blank | ND |
| GW54-00-0032 | Travel Trip Blank | 2 |
| GW54-00-0033 | Lab Storage Blank | ND |
| GW54-00-0034 | Lab Analysis Blank | ND |
| GW54-00-0037 | Hydrant Immediate Opening | ND |
| GW54-00-0038 | Hydrant 5 Minutes | ND |
| GW54-00-0039 | Holding Tank (Truck) | ND |
| GW54-00-0040 | EZ-Mud Plus | Polymerized could not analyze |
| GW54-00-0041 | Frac Tank – 200 | ND |
| GW54-00-0042 | Frac Tank – 371 | 24 |
| GW54-00-0043 | Quik – Foam | 2,090,000 # |
| GWCV-00-0002 | Frac Tank at Alternate Well R-25 | ND |

ND = Not Detected

# = Suspected false positive due to isopropyl alcohol.

## 1.3 Summary of Results

A QA/QC assessment of the data associated with the organic chemical analyses was conducted. The mass spectrums from the initial analysis showed that the injection water had large amounts of Isopropyl alcohol. This was identified as a concern for the following reasons:

1. Analysis by GC/MS uses gas chromatography for analyte separation and mass spectrometry for qualification and quantification.

   - The molecular weights between acetone (58.08) and isopropyl alcohol (60.1) are very similar. These compounds will elute very close to the same retention time on the typical GC/MS system during the analysis of SW-846 Method 8260. Acetone is a compound of interest, isopropyl alcohol is not.

   - The mass units for isopropyl alcohol are (m/z) 45, 43, 59, and 58. The mass units for acetone are 43 and 58. The mass spectrometer for qualification purposes uses the mass units and retention time. The analyte must elute in a certain retention time window and have the correct corresponding mass units for identification. The primary mass unit or primary ion is normalized at 100% and the secondary and tertiary ions must be present in certain ratios to the primary ion for proper qualification.

   - The mass spectrometer for quantification purposes uses the abundance of the primary ion only.

The problem arises that isopropyl alcohol has the same retention time and mass units very similar to acetone. The project team suspects that the results reported for acetone from the laboratory are false positives from the isopropyl alcohol. This is reinforced from the mass spectral data received from the laboratory. The acetone is being mis-identified because the secondary ion for isopropyl alcohol is 43, which is the primary ion for acetone. The analysis of the Baroid Quik-Foam confirms this suspicion. See attached results.

The only positive mass spectrums for acetone were identified in the Frac-Tanks 371 and 370. The project team believes the positive identification of acetone in the frac tanks is from a mild oxidation reaction, which converts isopropyl alcohol to acetone. The reaction is shown below:

$$CH_3\text{-}\underset{OH}{\overset{H}{C}}\text{-}CH_3 + 1/2O_2 = CH_3\text{-}\underset{CH_3}{\overset{CH_3}{C}}\text{=}O + H_2O$$

Isopropyl Alcohol Acetone

## 1.4 Conclusions

The results from the sampling for acetone at the R-22 deep well are presented above. The project team believes that the acetone identified in the injection water is a false positive from the large amount of isopropyl alcohol identified in the Quik-Foam product used during well drilling. The acetone positively identified in the Frac tanks is from the simple breakdown of isopropyl alcohol with oxygen under normal conditions.

# Los Alamos National Laboratory

**Environment, Safety & Health Division**
**ESH-18 Water Quality & Hydrology Group**

# Surface Water Assessment Erosion Matrix for PRS R-22

| CRITERIA EVALUATED | Value | Erosion/Sediment Transport Potential Low 0.1 | Medium 0.5 | High 1.0 | Calculated Score |
|---|---|---|---|---|---|
| **Site Setting (43)** | | | | | |
| On mesa top | 1 | Defined based on topographic setting | | | 1.0 |
| Within bench of canyon | 4 | | | | |
| Within the canyon floodplain but not watercourse | 13 | | | | |
| Within bottom of canyon channel in watercourse | 17 | | | | |
| Estimated % ground and canopy cover | 13 | >75% | 25-75% | <25% | 6.5 |
| Slope | 13 | 0-10% | 10-30% | >30% | 1.3 |
| **Surface Water Factors-Run-off (46)** | | | | | |
| Visible evidence of runoff discharging? (Yes/No) | 5 | If no, score of 0 for runoff section. | | | 5.0 |
| | | If yes, score 5 and proceed with section. | | | |
| Where does runoff terminate? | 19 | Other | Bench Setting | Drainage/Wetland | 19.0 |
| Has runoff caused visible erosion? (Yes/No) | 22 | Sheet | Rill | Gully | 0.0 |
| | | If no, score as 0. If yes, calculate as appropriate. | | | |
| **Surface Water Factors-Run-on (11)** | | | | | |
| Structures adversely affecting run-on (Yes/No) | 7* | If yes, score as 7. If no, score as 0. | | | 0.0 |
| Current operations adversely impacting (Yes/No) | 4 | If yes, score as 4. If no, score as 0. | | | 0.0 |
| Natural drainages onto site (Yes/No) | 7* | If yes, score as 7. If no, score as 0. | | | 0.0 |
| **Select either structures or natural drainages.* | | | | | |
| **MAX. POSSIBLE EROSION MATRIX SCORE:** | **100** | | | **Total Score** | 32.8 |

Report Printed 8/15/00 11:43:36 AM.

# Los Alamos National Laboratory
## SURFACE WATER
## SITE ASSESSMENT

**SITE INFORMATION**

**1a) PRS Number** R-22 **1b) Structure Number** **1c) FMU Number** ER

**2. Date/Time (M/D/Y H:M am/pm)** 8/8/00

**SITE SETTING (check all that apply)**

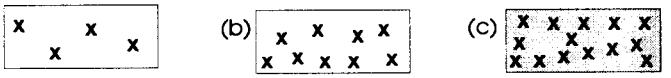
**3.** ◉ **On mesa top (a).** ○ **In the canyon floor, but not in an established channel (c)**

○ **Within a bench of a canyon (b).** ○ **Within established channel in the canyon floor (d).**

**Explanation:** Located on mesa top east of TA-54

**4.** Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

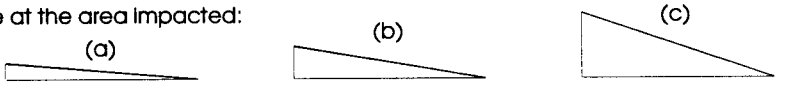


*Estimated % of ground/canopy cov* ○ 0% to 25% ◉ 25% to 75% ○ 75% to 100%

**Explanation:** Pinon and juniper, very little soil on top of exposed volcanic tuff.

**5.** Steepest slope at the area impacted:

(a) (b) (c)



◉ Less than 10% ○ 10% to 30% ○ 30% and greater

**Explanation:** Area is generally flat with a gradual slope towards the east.

**RUNOFF FACTORS**

**Y / N**

☑ ☐ **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

☐ ☑ 6a) Is runoff channelized? If yes, describ ○ Man-made channel. ○ Natural channel.

**Explanation:** Some natural drainage swales exist across the site.

**RUNOFF FACTORS, CONT'D**

6b) Where does evidence of runoff terminate?

- (●) **Drainage or wetland (name)** Pajarito Canyon
- ( ) **Within bench of canyon setting (name)**
- ( ) **Other (i.e., retention pond, meadow, mesa top)**

**Explanation:** Runoff from area terminates into Pajarito Canyon to the south-southeast.

**Y / N**

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain belo ( ) Sheet ( ) Rill ( ) Gully

**Explanation:** None observed.

**RUN-ON FACTORS**

**Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)**

☐ ☑ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

**Explanation:** No structural impact.

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

**Explanation:** No operational impact.

☐ ☑ **9.** Are natural drainage patterns directing stormwater onto site?

**Explanation:** No upslope run-on.

**ASSESSMENT FINDING:**

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Veenis, Steve

**11. Signature of Water Quality/Hydrology Representative**

_____ Initials of independent reviewer.

Check here when information is entered in database: ☑

**This page is for ESH-18 notes, recommendations, and photos.**

| | Y | N | |
|---|---|---|---|
| 12. a) | ○ | ◉ | Is there visible trash/debris on the site? |
| b) | ○ | ◉ | Is there visible trash/debris in a watercourse? |

**Description of existing BMPs:**

| | | |
|---|---|---|
| ○ | ○ | Are BMPs being properly maintained? If no, describe in "Other Internal Notes." |
| ○ | ○ | Are BMPs effectively keeping sediment in place and reducing erosion potential? |

**OTHER INTERNAL NOTES:**

**Enclosure 5**

**Photographs of the proposed R-22 Mesa top water discharge area**

**View of mesa top discharge area. Approximately 60 yards East of well site.**

**View of mesa top discharge area. Approximately 60 yards North east of well site.**

**Photographs of the proposed R-22 Mesa top water discharge area**

**View towards the R-22 well from the proposed water discharge area.**