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ENTERED

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

April 5, 2002

Dr. Inés Triay, Manager
Carlsbad Field Office
Department of Energy
P. O. Box 3090
Carlsbad, New Mexico 88221-3090

Mr. John Lee, General Manager
Westinghouse TRU Solutions LLC
P.O. Box 2078
Carlsbad, New Mexico 88221-5608

RE: NMED COMMENTS ON THE WIPP SEMI-ANNUAL GROUNDWATER MONITORING REPORT FOR MARCH – JUNE 2001, DATED SEPTEMBER 2001
WIPP HAZARDOUS WASTE FACILITY PERMIT
EPA I.D. NUMBER NM4890139088

Dear Dr. Triay and Mr. Lee:

On October 4, 2001, the Hazardous Waste Bureau (**HWB**) of the New Mexico Environment Department (**NMED**) received the document titled "WIPP Groundwater Detection Monitoring Program Semiannual Groundwater-Monitoring Report", Sampling Round 12, March through June 2001, from the Department of Energy Carlsbad Field Office and Westinghouse TRU Solutions LLC (the **Permittees**). The Permittees submitted this report in compliance with Permit Condition V.J.2.a. of the Hazardous Waste Facility Permit (**HWFP**).

In general, the report is technically adequate and reflects an effort from the Permittees to include data requested by NMED during their review of groundwater sampling Round 11 of the Detection Monitoring Program (**DMP**). Attached are NMED's comments on this report. NMED requests a formal written response to these comments within thirty (30) calendar days from the date you receive this letter. NMED may consider a petition for a deadline extension, provided that a written justification and the expected submittal date are given.

020406

Should you have any questions or require additional explanation on any of the items discussed in this letter, please contact William Fetner of my staff at (505) 428-2520 or me at (505) 428-2517.

Sincerely,

Steve Zappe
WIPP Project Leader
Permits Management Program

Attachment

cc: James Bearzi, Chief, HWB
John Kieling, Manager, Permits Management Program, HWB
Will Fetner, HWB
Laurie King, EPA Region 6
Connie Walker, TechLaw, Inc.
WIPP File - Red '02

NMED Comments on WIPP's Semi-Annual Groundwater Monitoring Report For March – June 2001, Dated September 2001

It should be noted that NMED's comments on this report were not only made for NMED's benefit but also with the general public in mind. NMED believes that the Permittees' goal should not only be to produce a document that meets the requirements of the HWFP but also to create a document that is detailed enough to satisfy the needs of interested stakeholders and the general public.

Note that the NMED's comments will reference previous groundwater sampling reports and correspondence between the Permittees and NMED. The following reports and correspondence may be referenced below: the Permittees' "WIPP RCRA Groundwater Quality Baseline Update Report – Addendum 1" (dated November 3, 2000); the Permittees' "WIPP Groundwater Detection Monitoring Program Semiannual Groundwater-Monitoring Report", Round #11, September to November 2000 (dated March 21, 2001); NMED's comments on Round 11 groundwater semi-annual report (dated June 29, 2001); the Permittees' response letter to NMED comments on Round 11 (dated August 30, 2001); NMED's additional comments on Round 11 (dated September 28, 2001); and the Permittees' response letter to NMED's additional comments on Round 11 (dated October 26, 2001).

A. Comments on the Main Text Section:

1. **Section 3.2, 1st Sentence, Pg. 8 –** In the future, the text should be more specific in stating the significance of Table 3. The table contains some, but not all as implied in the text, of the analytical results of the general chemistry parameters and major cations/anions. The table appears to contain those parameters that have shown over time, in one or more wells, elevated concentrations near or at the upper limit of ranges ("suspect concentration values" as stated in the Permittees' Round 11 semi-annual report dated 3/21/01).

2. **Section 3.2, Last Sentence, Pg. 8 –** The Permittees must provide detailed calculations on how the T_n outlier values were determined for magnesium in Well WQSP-1 and total organic halogens (**TOH**) for Wells WQSP-5 and -6. As shown in Attachment A (see pages 1 through 3, left set of data for each well), NMED tried to reproduce the values obtained by the Permittees. However, only the magnesium T_n value for WQSP-1 was confirmed. The values obtained by NMED for TOH for WQSP-5 and -6 were not only different from the Permittees but were also significantly above the critical value for this analyte (2.504). The Permittees need to show both the values used in the formula $T_n = (X_n - X)/S$ and the concentrations used in the population (use similar setup to that provided by the Permittees on their response to comments letter dated 10/26/01).

   In addition, NMED requests an explanation from the Permittees on the rationale for using current concentrations (i.e., Round 12 concentrations) as part of the population in the T_n outlier calculations. T_n outlier calculations are not a running average, and NMED fails to see the rationale why concentrations from the current sampling event are included in the average (**X**)

and standard deviation (**S**) calculations. Except for the X_n value (concentration of concern), all other variables should be strictly based on baseline concentrations (Rounds 1 through 10). This being said, Attachment A also includes T_n values calculated by NMED where X and S values were derived without using concentrations from Round 12 (see pages 1 through 3, right set of data for each well). As shown, all new T_n values were above the respective critical values for magnesium and TOH.

3. **Section 3.3, 2nd Paragraph, Pg. 8 –** It is reported that lithium concentrations for Wells WQSP-2 and -6 did not pass the T_n outlier test and that the "concentrations are probably not realistic members of the expected sample populations". The Permittees should expand on the significance of the quoted statement. Does this mean that the concentrations, although statistically significant, are part of the 5 percent (or 1 in 20) that would be expected to be above the 95th percentile or 95 UTLV and, therefore, do not necessarily represent contamination (statistical outlier)? Please confirm. Also, expand on why the laboratory has had difficulty with lithium analyses.

   Same as stated in Comment 2 above, the Permittees must provide detailed calculations (including the population used) on how the T_n outlier values were determined for lithium in WQSP-2 and -6. NMED can only confirm the T_n value from WQSP-2 (see pages 4 and 5 in Attachment A, left data set). Also as stated in Comment 2 above, NMED believes Round 12 concentrations should not be considered when calculating variables X and S (see right data set for each of these wells).

4. **Table 3, Pgs. 9 through 11:**

   4.a) Based on the laboratory report, the general chemistry concentrations shown on this table for Well WQSP-2 appear to have been reversed between the sample and its duplicate. Please confirm.

   4.b) The potassium and sodium concentrations shown on the table for WQSP-6a sample and its duplicate do not agree with those presented in the laboratory report; the concentrations presented in the laboratory report appear to have been switched between these two metals. Based on historical concentrations, NMED assumes that Table 3 shows the correct concentrations. Please verify (if assumption is correct, the laboratory report should be amended).

5. **Section 3.4, 1st Paragraph, Last Sentence, Pg. 12 –** Please state what percentage error would have constituted the analyses as "unreliable" (i.e., 10 %?).

6. **Section 3.5, 3rd Paragraph, Pg. 13 –** Unlike Round 11, the Permittees have not provided a Data Validation Checklist for Round 12. Although data validation qualifiers are provided in Section 3.5 for each well, NMED found the checklist provided with Round 11 very useful as a

quick reference to determining possible sampling and/or laboratory deficiencies. If available for Round 12, please provide this checklist.

7. **Section 3.5, Pgs. 13–26, Monitor Well Data Validation Comments –** NMED performed a cursory review of the Permittees' Data Validation and Verification Section 3.5. The following are errors/inconsistencies found in each of the individual well validation sections. (Because NMED did not perform a detailed quality assurance/quality control **[QA/QC]** review of the laboratory data, it should not be assumed that all possible errors/inconsistencies are reported below.)

   7.a) WQSP-2, Summary for Inorganic Analysis: metal duplicates exceed the RPD QC acceptance criteria for calcium, magnesium, potassium and sodium (73.7, 68.1, 51.5, and 191.2%, respectively, all >20% QC criteria)

   7.b) WQSP-3, Summary for Inorganic Analysis: an explanation should be given on why there were so many MS samples outside the QC criteria for percent recoveries in this well (16 metals are outside QC acceptance). Also, explain the significance of boron showing a %R of -7,800

   7.c) WQSP-4, Summary for Inorganic Analysis:
   - 7.c.1) Metal duplicates exceed the RPD QC criteria for iron and selenium (159.7 and 25.0%, respectively, both >20% QC criteria)
   - 7.c.2) Same comment as Comment 7.b) above. At least 11 metals are outside the MS %R QC acceptance criteria (<75%). Also, explain the significance of boron showing a %R of 7,200
   - 7.c.3) Although reported as biased low, note that MS recoveries for iron, mercury and selenium were 86, 117 and 76%, respectively, which are within the QC acceptance criteria (75–125%). Also note that tin recovery was 37% which is above the rejection low of <30%; however, sodium had a 16% recovery

   7.d) WQSP-4, Summary for volatile organic aromatics (**VOC**s): NMED's copy of the report is missing the MS and MSD laboratory report for this well

   7.e) WQSP-5, Summary for Inorganic Analysis:
   - 7.e.1) The metal duplicate RPD for selenium exceeds the QC criteria (21.6% >20% QC criteria)
   - 7.e.2) Same comment as Comment 7.b) above - at least 12 metals are outside the MS %R QC acceptance criteria. It appears that selenium (73 %R) and sodium (62 %R) should be added to the list of MS %R not meeting the QC criteria (<75%). Also, explain the significance of boron showing a %R of 7,200

7.f) WQSP-6, Summary for Inorganic Analysis:
- 7.f.1) In addition to boron and silica, the metal duplicate RPD for iron also exceeds the QC criteria (38.6% >20% QC criteria)
- 7.f.2) Lithium (180 %R) should be added to the list of MS %R exceeding the QC criteria (>125%). Also, explain the significance of boron and silica having % recoveries of -1,800% and -122%, respectively
- 7.f.3) The LCS %R for boron was 49%; since this is <50% QC rejection criteria, should this result be rejected (50% - 79% recoveries are qualified as estimated)?
- 7.f.4) Table 10: the "Comment" section for silica should include the designation of "DA", duplicate analysis

7.g) WQSP-6, Summary for SVOCs: Table 10 shows the internal standards (**IS**) as being outside the QC acceptance criteria for all the organics; however, no text is included in this section explaining the details of this QC violation

7.h) WQSP-6a, Summary for Inorganic Analysis:
- 7.h.1) The metal duplicate RPD for lead exceeds the QC criteria (42.4% >20% QC criteria)
- 7.h.2) Note that the laboratory report for the MS recovery (appendix for WQSP-6a, Section II, page 19) shows a sample identification of WQ6CR12N7D. We are assuming this is a laboratory typo and that this data is not associated with well WQSP-6
- 7.h.3) NMED's copy of the report does not contain the laboratory report for WQSP-6a that confirms the statement that the iron LCS/LCSD RPD exceeds the QC criteria (37% > 20%). In addition, NMED's laboratory report copy does not show the LCS recovery for boron.

7.i) WQSP-6a, Summary for VOCs: no VOCs laboratory analytical results/report for the sample and its duplicate were included in NMED's copy of the report. Please submit only the laboratory report for the sample and the duplicate (NMED has the QA/QC results for VOCs on this well).

7.j) WQSP-6a, Summary for SVOCs: NMED's report copy is missing the MS/MSD laboratory report for this well.

8. **General Comment –** NMED has a few comments regarding the calculation of the 95th percentile and the 95th UTLV as presented in the subject report and previously calculated by the Permittees on their "WIPP RCRA Groundwater Quality Baseline Update Report – Addendum 1" dated November 3, 2000.

8.a) Based on NMED's calculations presented in Attachment A (see page 5), the 95th percentile value for lithium for Well WQSP-6 should be 0.5 mg/L, which does not agree with the value calculated by the Permittees on their groundwater baseline report (0.404

mg/L, nor is it the maximum concentration in the population). Please show the calculations used to obtain this value presented in the groundwater baseline report.

8.b) NMED also requests that the Permittees provide detailed calculations on how the values for 95th UTLV were obtained for Wells WQSP-1 for magnesium (1,247 mg/L) and WQSP-5 and -6 for TOHs (8.37 and 1.54 mg/L, respectively).

9. **General Comment –** Based on the Permittees' response to comments letter for Round 11 (dated 8/30/01), the Permittees stated that future semi-annual sampling reports will contain 1) a discussion of current and past groundwater flow directions and 2) a table containing well construction information on the designated sampling wells. NMED's copy of Round 12 report contains neither. Please submit this information on this and future monitoring reports.

10. **General Comments –** The following are suggestions in order to make future semi-annual reports more reader-friendly.

10.a) Some of the tables in the text were placed on awkward locations instead of being located in their relevant sections of the report; i.e., Table 1 would fit better within Section 3.1; Table 4 would fit better within Section 3.4; Tables 9 and 10 within the corresponding well sections (WQSP-5 and -6, respectively).

10.b) In order to find the results of analyses, the reader has to either look for concentrations on Table 3 (which only contains some results for the general chemistry parameters and major cations/anions) or has to look at specific wells within the attachments of the report (laboratory reports, box-whisker plots and/or time trends charts). NMED believes that a new table(s) should be introduced in future reports that would be similar in content and structure to those used by the Permittees on the groundwater baseline update report (dated 11/3/00), specifically Tables 2 through 15 of that report. These tables could be modified to include new analytical results by adding two new columns containing the current sample concentration and its duplicate result. These summary tables would not only show all current concentrations in one location but would offer a quick reference to important background concentrations and statistical values. Note that existing columns such as "N", "Percent ND" and "Distribution Type" could be removed from the proposed table and that VOCs/SVOCs results would not have to be included since, thus far, these parameters have been found to be below detection limits.

B. Comments on the Individual Well Sections / Appendices:

1. Chain-of-Custody (C-O-C) and Request for Analysis (RFA) Forms Comments:

1.a) Note that it is good practice for C-O-Cs to be relinquished (signed) by at least one member of the sampling team. This practice shows good continuity on the delegation of the sample

kit. Only the C-O-Cs from Wells WQSP-5 and -6 were relinquished by a sampling team member. (This comment was previously brought up by NMED on their comment letter for Round 11, dated 6/29/01.)

1.b) The C-O-Cs and the RFA forms did not state the EPA Methods to be performed by the laboratory (analytes to be analyzed were reported but no mention of specific SW-846 analytical methods)

1.c) Although the C-O-Cs and RFA forms had Control Numbers on the top right side of the forms, they should also have page numbers (i.e., page x of y) in case they become separated

1.d) The C-O-Cs did not contained information from the laboratory on the condition of the sampling bottles when received by the same.

2. **Well Purging Comments:**

2.a) WQSP-1 – The amount of water pumped from previous sampling rounds shows one too many events (12 vs. 11 volume amounts). Also, some commas appear to be misplaced when listing the pumped amounts

2.b) WQSP-2 and -5 – Inconsistency on the reported total amount of groundwater purged from these wells during Round 12: 1,726 vs. 1,896 gallons in WQSP-2 and 1,539 vs. 1,744 gallons in WQSP-5

2.c) WQSP-6 and -6a – These wells show wrong final sample collection dates: May 2nd vs. actual date of May 16th for WQSP-6; May 2nd vs. actual date of June 6th for WQSP-6a. To be consistent with other wells, WQSP-6 and -6a should also include the information provided under the heading "Comparison of Round-12 Results with Previous Rounds", specifically the volume of groundwater pumped from previous rounds for comparison purposes.

3. **Total Organic Halogens –** All wells, except for WQSP-1, exceeded the holding time for TOH (7 days). The holding time was exceeded by 5 to 7 days in the referenced wells. This holding time violation also occurred on Round 11 and the Permittees addressed this issue on their October 26, 2001, response letter to NMED. Even though TOHs are not subject to stringent quality control requirements and are not included in the data validation process, the contract laboratory should comply with the holding requirements and end to what seems to be a common occurrence for this particular analyte. The Permittees should state that the TOH results for the subject wells are just estimates given that the holding times were exceeded for this parameter.

4. **Time Trend Plot Comments** - NMED conducted random spot checks on the box whisker graphs and the time trend plots. Following are several inconsistencies found in the time trend

plots when compared to values reported by the Permittees on their groundwater baseline update report (dated 11/3/00). These inconsistencies by no means signify that NMED has identified all possible inconsistencies and/or errors in these plots.

4.a) WQSP-1:

4.a.1) The plot for lithium shows the 95th UTLV line approximately at 0.55 mg/L; according to the baseline update report, the 95th UTLV line should be at 2.47 mg/L (95th % = 0.517 mg/L)

4.a.2) The plot for chloride shows the 95th UTLV line approximately at 39,100 mg/L; the 95th UTLV line should be at 40,472 mg/L (95th % = 40,000 mg/L)

4.b) WQSP-2: The plot for magnesium shows the 95th UTLV line approximately at 1,300 mg/L; the 95th UTLV line should be at 1,244 mg/L (95th % = 1,180 mg/L)

4.c) WQSP-4: The plot for TOH shows the 95th UTLV line approximately at 17 mg/L; the 95th UTLV line should be at 84.1 mg/L (95th % = 17.0 mg/L)

4.d) WQSP-6:

4.d.1) The chloride baseline had 0 percent non-detects and, therefore, should have a parametric distribution with a 95th UTLV value. This value was not reported in the baseline update report. The time trend plot for Round 12, however, shows a 95th UTLV line for chloride at approximately 6,100 mg/L. Note that the 95th percentile for this analyte is reported as 15,800 mg/L in the baseline update report. Please explain the inconsistencies

4.d.2) The plot does not show the TOH results from Round 12 (2.1 mg/L for the sample and its duplicate); the concentrations for this round are outside the range of the graph

4.e) WQSP-6a: Similar comment to 4.d.1) above regarding chloride. The baseline update report did not calculate a 95th UTLV for chloride even though it shows a parametric distribution. However, the time trend plot for chloride in Round 12 depicts a 95th UTLV line at approximately 1,025 mg/L. The 95th percentile is reported as 6,723 mg/L. Please explain the inconsistencies.

It is imperative to report the exact location of the 95th UTLV (or 95th percentile, if applicable) lines for these plots, since any data point reported above these lines are considered statistically-significant exceedances to established background values (i.e., outliers or possible contamination).

ATTACHMENT A

DMP ROUND 12 STATISTICAL CALCULATIONS - Tn

WQSP-1 MAGNESIUM STATISTICS

Baseline + Round 12 Analytical Results	Round
1110 mg/L sample concentration	1
1050 mg/L sample concentration	2
1020 mg/L sample concentration	3
928 mg/L sample concentration	4
1180 mg/L sample concentration	5
1160 mg/L sample concentration	6
1140 mg/L sample concentration	7
993 mg/L sample concentration	8
1100 mg/L sample concentration	9
1112 mg/L sample concentration	10
1255 mg/L sample concentration	12 *
1080 mg/L duplicate concentration	1
1040 mg/L duplicate concentration	2
982 mg/L duplicate concentration	3
1000 mg/L duplicate concentration	4
1170 mg/L duplicate concentration	5
1130 mg/L duplicate concentration	6
1060 mg/L duplicate concentration	7
1120 mg/L duplicate concentration	9
1100 mg/L duplicate concentration	10

Baseline Analytical Results	Round
1110 mg/L sample concentration	1
1050 mg/L sample concentration	2
1020 mg/L sample concentration	3
928 mg/L sample concentration	4
1180 mg/L sample concentration	5 *
1160 mg/L sample concentration	6
1140 mg/L sample concentration	7
993 mg/L sample concentration	8
1100 mg/L sample concentration	9
1112 mg/L sample concentration	10
1080 mg/L duplicate concentration	1
1040 mg/L duplicate concentration	2
982 mg/L duplicate concentration	3
1000 mg/L duplicate concentration	4
1170 mg/L duplicate concentration	5
1130 mg/L duplicate concentration	6
1060 mg/L duplicate concentration	7
1120 mg/L duplicate concentration	9
1100 mg/L duplicate concentration	10

	Statistics Using Round 12 concentrations (duplicate not used)	Statistics Not Using Round 12 concentrations
Average =	1086.500	1077.632
Median =	1100	1100
Count =	20	19
Std. Deviation =	78.76714517	69.91837346
95th % =	1183.75	1171

$T_n = (X_n - X) / S$

$T_n =$ (1255 - 1086.5) / 78.767

$T_n =$ **2.139**

DOE T_n = 2.139

Critical Value = 2.532

$T_n =$ (1255 - 1077.632) / 69.918

$T_n =$ **2.537**

Notes: duplicate of Round 8 (<1.0 mg/l) was dropped from the population.
* = highest concentration detected.

ATTACHMENT A

DMP ROUND 12 STATISTICAL CALCULATIONS - Tn

WQSP-5 TOTAL ORGANIC HALOGENS STATISTICS

Baseline + Round 12 Analytical Results	Round
0.0549 mg/L sample concentration	1
0.0630 mg/L sample concentration	2
0.0348 mg/L sample concentration	3
0.0288 mg/L sample concentration	4
0.0128 mg/L sample concentration	5
0.8000 mg/L sample concentration	7
0.8700 mg/L sample concentration	8
0.2900 mg/L sample concentration	9
1.2000 mg/L sample concentration	10
8.7000 mg/L sample concentration	12 *
0.0526 mg/L duplicate concentration	1
0.0640 mg/L duplicate concentration	2
0.0359 mg/L duplicate concentration	3
0.0365 mg/L duplicate concentration	4
0.0100 mg/L duplicate concentration	5
1.0400 mg/L duplicate concentration	7
0.8500 mg/L duplicate concentration	8
0.3900 mg/L duplicate concentration	9
1.2000 mg/L duplicate concentration	10

Baseline Analytical Results	Round
0.0549 mg/L sample concentration	1
0.0630 mg/L sample concentration	2
0.0348 mg/L sample concentration	3
0.0288 mg/L sample concentration	4
0.0128 mg/L sample concentration	5
0.8000 mg/L sample concentration	7
0.8700 mg/L sample concentration	8
0.2900 mg/L sample concentration	9
1.2000 mg/L sample concentration	10 *
0.0526 mg/L duplicate concentration	1
0.0640 mg/L duplicate concentration	2
0.0359 mg/L duplicate concentration	3
0.0365 mg/L duplicate concentration	4
0.0100 mg/L duplicate concentration	5
1.0400 mg/L duplicate concentration	7
0.8500 mg/L duplicate concentration	8
0.3900 mg/L duplicate concentration	9
1.2000 mg/L duplicate concentration	10 *

	Statistics Using Round 12 concentrations (duplicate not used)	Statistics Not Using Round 12 concentrations
Average =	0.828	0.391
Median =	0.064	0.0635
Count =	19	18
Std. Deviation =	1.957857705	0.459397772
95th % =	1.95	1.2

$T_n = (X_n - X) / S$

$T_n =$ (8.7 - 0.828) / 1.958
$T_n =$ 4.021

DOE $T_n = 2.084$
Critical Value = 2.504

$T_n =$ (8.7 - 0.391) / 0.459
$T_n =$ 18.087

Notes: no samples were collected for Round 6.
* = highest concentration detected.

ATTACHMENT A

DMP ROUND 12 STATISTICAL CALCULATIONS - Tn

WQSP-6 TOTAL ORGANIC HALOGENS STATISTICS

Baseline + Round 12 Analytical Results	Round	Baseline Analytical Results	Round
0.0600 mg/L sample concentration	1	0.0600 mg/L sample concentration	1
0.0573 mg/L sample concentration	2	0.0573 mg/L sample concentration	2
0.0601 mg/L sample concentration	3	0.0601 mg/L sample concentration	3
0.0128 mg/L sample concentration	4	0.0128 mg/L sample concentration	4
0.0145 mg/L sample concentration	5	0.0145 mg/L sample concentration	5
0.4700 mg/L sample concentration	7	0.4700 mg/L sample concentration	7
0.2000 mg/L sample concentration	8	0.2000 mg/L sample concentration	8
0.1700 mg/L sample concentration	9	0.1700 mg/L sample concentration	9
0.5600 mg/L sample concentration	10	0.5600 mg/L sample concentration	10 *
2.1000 mg/L sample concentration	12 *	0.0310 mg/L duplicate concentration	1
0.0310 mg/L duplicate concentration	1	0.0536 mg/L duplicate concentration	2
0.0536 mg/L duplicate concentration	2	0.0647 mg/L duplicate concentration	3
0.0647 mg/L duplicate concentration	3	0.0185 mg/L duplicate concentration	4
0.0185 mg/L duplicate concentration	4	0.0224 mg/L duplicate concentration	5
0.0224 mg/L duplicate concentration	5	0.4500 mg/L duplicate concentration	7
0.4500 mg/L duplicate concentration	7	0.1600 mg/L duplicate concentration	8
0.1600 mg/L duplicate concentration	8	0.1700 mg/L duplicate concentration	9
0.1700 mg/L duplicate concentration	9	0.1600 mg/L duplicate concentration	10
0.1600 mg/L duplicate concentration	10		

	Statistics Using Round 12 concentrations (duplicate not used)	Statistics Not Using Round 12 concentrations
Average =	0.254	0.152
Median =	0.0647	0.0624
Count =	19	18
Std. Deviation =	0.476410425	0.169808851
95th % =	0.714	0.4835

$T_n = (X_n - X) / S$

$T_n =$ (2.1 - .254) / 0.476
$T_n =$ **3.874**

$T_n =$ (2.1 - 0.152) / 0.170
$T_n =$ **11.472**

DOE T_n = 2.226
Critical Value = 2.504

Notes: no samples were collected for Round 6.
* = highest concentration detected.

ATTACHMENT A

DMP ROUND 12 STATISTICAL CALCULATIONS - Tn

WQSP-2 LITHIUM STATISTICS

Baseline + Round 12 Analytical Results	Round
0.4170 mg/L sample concentration	1
0.3540 mg/L sample concentration	2
0.4140 mg/L sample concentration	3
0.3730 mg/L sample concentration	4
0.4120 mg/L sample concentration	5
0.3910 mg/L sample concentration	6
0.3200 mg/L sample concentration	7
0.3300 mg/L sample concentration	8
0.4940 mg/L sample concentration	10
0.4800 mg/L sample concentration	10
0.7270 mg/L sample concentration	12 *
0.4140 mg/L duplicate concentration	1
0.3620 mg/L duplicate concentration	2
0.3990 mg/L duplicate concentration	3
0.3970 mg/L duplicate concentration	4
0.3730 mg/L duplicate concentration	5
0.4010 mg/L duplicate concentration	6
0.3600 mg/L duplicate concentration	7
0.0100 mg/L duplicate concentration	8
0.4920 mg/L duplicate concentration	10
0.4860 mg/L duplicate concentration	10

Baseline Analytical Results	Round
0.4170 mg/L sample concentration	1
0.3540 mg/L sample concentration	2
0.4140 mg/L sample concentration	3
0.3730 mg/L sample concentration	4
0.4120 mg/L sample concentration	5
0.3910 mg/L sample concentration	6
0.3200 mg/L sample concentration	7
0.3300 mg/L sample concentration	8
0.4940 mg/L sample concentration	10 *
0.4800 mg/L sample concentration	10
0.4140 mg/L duplicate concentration	1
0.3620 mg/L duplicate concentration	2
0.3990 mg/L duplicate concentration	3
0.3970 mg/L duplicate concentration	4
0.3730 mg/L duplicate concentration	5
0.4010 mg/L duplicate concentration	6
0.3600 mg/L duplicate concentration	7
0.0100 mg/L duplicate concentration	8
0.4920 mg/L duplicate concentration	10
0.4860 mg/L duplicate concentration	10

	Statistics Using Round 12 concentrations (duplicate not used)	Statistics Not Using Round 12 concentrations
Average =	0.400	0.384
Median =	0.3990	0.3980
Count =	21	20
Std. Deviation =	0.124289639	0.101794155
95th % =	0.494	0.4921

$T_n = (X_n - X) / S$

$T_n =$ (0.727 - 0.4) / 0.124
$T_n =$ **2.629**

$T_n =$ (0.727 - 0.384) / 0.102
$T_n =$ **3.370**

DOE T_n = 2.629
Critical Value = 2.557

Notes: no samples were collected for Round 9; 2 set of samples were collected for Round 10.
* = highest concentration detected.

ATTACHMENT A

DMP ROUND 12 STATISTICAL CALCULATIONS - Tn

WQSP-6 LITHIUM STATISTICS

Baseline + Round 12		Baseline	
Analytical Results	**Round**	**Analytical Results**	**Round**
0.2490 mg/L sample concentration	1	0.2490 mg/L sample concentration	1
0.2430 mg/L sample concentration	2	0.2430 mg/L sample concentration	2
0.2740 mg/L sample concentration	3	0.2740 mg/L sample concentration	3
0.2370 mg/L sample concentration	4	0.2370 mg/L sample concentration	4
0.2400 mg/L sample concentration	5	0.2400 mg/L sample concentration	5
0.2500 mg/L sample concentration	6	0.2500 mg/L sample concentration	6
0.3400 mg/L sample concentration	7	0.3400 mg/L sample concentration	7
0.5000 mg/L sample concentration	8	0.5000 mg/L sample concentration	8 *
0.3600 mg/L sample concentration	9	0.3600 mg/L sample concentration	9
0.4260 mg/L sample concentration	10	0.4260 mg/L sample concentration	10
1.0800 mg/L duplicate concentration	12 *	0.2720 mg/L duplicate concentration	1
0.2720 mg/L duplicate concentration	1	0.2340 mg/L duplicate concentration	2
0.2340 mg/L duplicate concentration	2	0.2350 mg/L duplicate concentration	3
0.2350 mg/L duplicate concentration	3	0.2250 mg/L duplicate concentration	4
0.2250 mg/L duplicate concentration	4	0.3700 mg/L duplicate concentration	5
0.3700 mg/L duplicate concentration	5	0.2188 mg/L duplicate concentration	6
0.2188 mg/L duplicate concentration	6	0.3400 mg/L duplicate concentration	7
0.3400 mg/L duplicate concentration	7	0.5000 mg/L duplicate concentration	8 *
0.5000 mg/L duplicate concentration	8	0.3620 mg/L duplicate concentration	9
0.3620 mg/L duplicate concentration	9	0.3820 mg/L duplicate concentration	10
0.3820 mg/L duplicate concentration	10		

	Statistics Using Round 12 concentrations (using duplicate)	Statistics Not Using Round 12 concentrations
Average =	0.349	0.313
Median =	0.2740	0.2730
Count =	21	20
Std. Deviation =	0.188869711	0.08973628
95th % =	0.5	0.5

$T_n = (X_n - X) / S$

$T_n =$ (1.08 - 0.349) / 0.189
$T_n =$ 3.868

DOE $T_n = 3.570$
Critical Value = 2.557

$T_n =$ (1.08 - 0.313) / 0.090
$T_n =$ 8.548

Note: * = highest concentration detected.