Bonano, Eugenio

From: Mike Carr [MCARR@energysolutions.com]
Sent: Friday, April 29, 2011 9:49 AM
To: Snell, William
Cc: Bonano, Eugenio; Lee, Peter; Lipa, Christine
Subject: RE: SU2 Status

Thanks Bill,

I will start on a response addressing the comments as outlined in the email early next week. Many of these will be simple to address and should provide closure to any concerns regarding the status of Survey units 2 and 3 as well as the on-site backfill.

Michael

From: Snell, William [mailto:William.Snell@nrc.gov]
Sent: Friday, April 29, 2011 9:05 AM
To: Mike Carr
Cc: Bonano, Eugenio; Lee, Peter; Lipa, Christine
Subject: RE: SU2 Status

Mike,

Peter, Gene and I have reviewed SU2 & SU3, and discussed the backfilling and water issues. Our comments are provided below. Let me know if you have any questions.

Bill Snell
630-926-1250

==========

1. Draft FSS Reports for SU2 & SU3

Both reports have been reviewed and appear acceptable other than addressing #2 below.

It was noted that a number of biased sampling locations exceeded the SOF value of 1. As an ALARA approach to the remediation, is it possible to remediate these areas, even where the average SOF is less than 1? In addition, whether the site meets the DCGL or not is based on the statistical test, not average concentration. Since there was no statistical test provided, at a minimum this needs to be included to ensure site meets the release criteria, unless all the samples have a SOF less than 1.

2. Backfilling

Section 3.2 states that, "All other areas below the action levels were removed and treated as clean overburden and stockpiled within SU1". Please clarify the scanning/sampling that was conducted to determine what was clean overburden. Please provide the average concentration levels for the clean overburden. What will the thickness of the clean overburden backfill be once placed in the trenches?

Based on inspection activities, 27 bags of contaminated waste soil remain that will be used as backfill for up to a two foot layer. Describe how the radiological concentration of each bag was determined, and provide what those average concentrations are.

How many cubic feet of clean overburden soil and contaminated waste soil are there? What volume of clean soil will need to be brought in from offsite? What are the minimum and maximum depths of clean soil that will remain over the contaminated soil once the remediation is completed?

3. Water Management

From a radiological standpoint, filter the water, remove the dirt, keep the filtered water in the holding tank, then sample the water. As long as any detectable radioisotopes are below the 10 CFR Part 20 effluent release limits, then the water can be released.

The State will have to address any chemical contamination discharge issues.

From: Mike Carr [mailto:MCARR@energysolutions.com]
Sent: Thursday, April 28, 2011 11:25 AM
To: Bonano, Eugenio; Snell, William
Subject: SU2 Status

Eugenio and Bill,

Can you give me a status on the SU2 data package review?

Thanks,

Michael Carr, CHP
Radition Safety Officer
Global Commercial Group Ops
Energy*Solutions*
865-425-4587

Bonano, Eugenio

From: Mike Carr [MCARR@energysolutions.com]
Sent: Friday, May 06, 2011 3:25 PM
To: Snell, William; Bonano, Eugenio
Cc: Art Palmer; Glenn S. Centola; Jim Allen; Lee, Peter; Lipa, Christine
Subject: Comment Response - SU2 and SU3
Attachments: NRC Comment Response SU2 and SU3.pdf

Bill and Eugenio,

Attached you will find our response to the comments as provided in the email received on April 29th. If you have any further questions, please let me know.

Michael Carr, CHP
Radiation Safety Officer
Global Commercial Group Ops
Energy*Solutions*
865-425-4587

ENERGY*SOLUTIONS*

May 6, 2011

U.S. Nuclear Regulatory Commission, Region III
Attn: Eugenio Bonano
2443 Warrenville Rd
Suite 210
Lisle, IL 60532-4352

RE: NRC Comment Response; E-mail dated April 29th 2011 from William Snell – SU2 Status

Energy*Solutions* has reviewed the NRC comments as provided in the e-mail as referenced above. The following text provides Energy*Solutions*' responses regarding the NRC questions concerning the Breckenridge Disposal Site Survey Packages for Survey Units 2 and 3 (SU2 and SU3). This text and data will be included in the Final Status Survey Report to be submitted as a consolidated report for the Breckenridge Disposal Site at the end of the project; however, we do not intend to revise the previously submitted individual reports for SU2 and SU3.

Comment 1a: *It was noted by the NRC that although both reports for SU2 and SU3 appear to be acceptable, there was no statistical testing provided as part of either submittal.*

Response: Energy*Solutions* did in fact perform the Sign Test for both survey units; however, this data was omitted from both submittals. The sign test was applied in accordance with Section 8.3 and Appendix I of MARSSIM. Although the contaminants of concern were present in background, the sign test was applied for simplicity and the results considered conservative as credit for background was not taken into consideration. Each systematic sample result was directly compared to the $DCGL_W$ for site release and presented as a Sum of Fractions (SOF). Samples with an SOF of less than one were considered positive differences ($DCGL_W$ – Sample) while those exceeding an SOF of one were not. The total number of positive differences were determined and compared to a critical value as based upon the number of samples collected. Provided the number of positive differences exceeds the critical value, the survey unit passes the Sign Test. A summary of the results from the Sign Test for both SU2 and SU3 are provided as Attachment 1.

It should be noted that in accordance with MARSSIM guidance, only the systematic samples were included in the Sign Test. Biased samples are not intended to be included in the statistical testing other than as part of the Elevated Measurement Comparison (EMC) test in the event that any elevated measurements are identified. The systematic sampling was divided into two groups, general survey unit samples (triangular grid) and trench samples (1 per 10 linear feet). Both systematic groups passed the Sign Test as shown in the Attachment. Additionally, if the biased samples are included as part of the total data set, both survey units would still pass the Sign Test.

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Comment 1b: *It was noted that a number of sample locations exceeded an SOF of 1. As an ALARA approach to remediation, is it possible to remediate these areas, even where the average SOF is less than 1.*

Response: Based upon the basis and guidance of MARSSIM, it is understood that there will be some residual contamination that remains and that the testing criteria is statistically based such that there is a required minimum amount of confidence that the site meets the requirements for release. This includes small areas of elevated activity that exceed the DCGLs as evaluated using Area Factors (AFs) and the EMC test as addressed in Section 8.5 of MARSSIM. As demonstrated in both the SU2 and SU3 submittals, both survey units passed the EMC testing criteria, well below an overall SOF of 1 for each unit, even without taking consideration for natural background in the calculations. As a result, we consider the remediation of both survey units to be complete and Energy*Solutions* is not planning to perform any further remediation in either area. Energy*Solutions* considers that the ALARA objective has been met and that any further soil remediation would be cost prohibitive.

Comment 2a: *Please clarify the scanning/sampling that was conducted to determine what was clean overburden. Please provide the average concentration levels for the clean overburden. What will the thickness of clean overburden backfill be once placed in the trenches.*

Response: As part of site remediation, areas of soil within SU2 and SU3 were considered "clean" overburden depending upon the surface scans and soil sampling results. This soil was removed and stockpiled in the NW corner of the site within SU1 to be used as backfill upon returning the site to grade. As each lift within SU2 and SU3 was remediated, following the removal of any contaminated soil, the balance of the lift or "clean" overburden was removed to facilitate further remediation within SU2 and SU3 as needed. A total of approximately 1,000 to 1,500 cubic yards of "clean" overburden was removed and stockpiled. In accordance with the project Work Plan, one composite soil sample was collected for every 20 cubic yards of "clean" overburden removed. A total of 81 composite samples were collected and evaluated against the surface soil DCGLs. These results are presented as Attachment 2. The attachment also presents the average concentrations of contaminants within the overburden soils.

Based upon a review of the overburden data, the results are very close to background concentration levels. The results of the background study as performed on a similar parcel of land along East Madison Ave. are presented as Attachment 3 for reference. It should be noted, that although surface scans were performed on all the "clean" overburden that was stockpiled, it will be difficult to adequately extract the data; however, all soils that were removed and stockpiled were well below the action levels as determined for field scanning. In order to ensure the data is available as part of the Final Status Survey Report, surface scans will be performed as SU2 and SU3 are backfilled using the "clean" overburden stockpile following each lift as it is replaced.

The "clean" overburden, as stockpiled from SU2 and SU3, will be used to backfill the portions of the excavation exceeding 1.5 meters in depth and will be primarily used to fill the remaining

portions of the trenches to level them off with the rest of the excavation at or near 5 feet below grade surface (bgs). Assuming an overburden volume of 1,250 cubic yards and a surface area of 900 m^2 within SU2 and SU3 which currently exceeds 1.5 meters bgs, the thickness of replaced soil from the overburden stockpile would be approximately 1.25 meters or 4 feet on average.

Comment 2b: *Based on inspection activities, 27 bags of contaminated waste soil remain that will be used as backfill up to a two foot layer. Describe how the radiological concentration of each bag was determined, and provide the average concentrations.*

Response: The 27 bags remaining on site primarily consist of the earliest bags loaded prior to the re-evaluation of the DCGLs. Based upon the current evaluation, these bags are at or below the release criteria for subsurface soils as established and will be used as backfill within the trenches themselves in SU3 which are greater than 1.5 meters in depth so they are currently not considered "waste". The average concentration of these bags has been calculated based upon the activity ratios as determined from remediation sampling and dose modeling using Microshield and the maximum observed dose rate on each bag. The average and maximum concentrations for the 27 bags as calculated are provided in Attachment 4.

To ensure the soil within these 27 bags are adequate to be used as backfill as currently assessed, the soil will be dumped out, leveled, scanned and composite samples collected prior to use as backfill in the SU3 trenches. Any soil exceeding the subsurface DCGLs will be segregated and re-bagged as waste for shipped and disposal. All other soils meeting the subsurface soil DCGLs will be used to backfill the bottom of the trenches in SU3.

Based upon an average volume of about 4.15 yards per bag, there is a total volume of 112 yards that would be placed back into the bottom of trenches. The trench area (aerial planar view) within SU3 is approximately 215 m^2. This would result in an average thickness of 0.5 meters or about 1.5 feet of soil placed back in the bottom of the trenches within SU3 ensuring it is less than 2 feet.

As further assurance to ensure that replacing the soil from the 27 bags would not significantly impact the potential dose to the critical member of the public, the potential residual dose was re-evaluated using the EMC test for SU3 assuming an additional dose contribution from the trench areas using the average concentration of the soils from the 27 bags that would be replaced within the trenches. This re-evaluation resulted in an overall SOF for SU3 of 0.524 as opposed to the original SOF of 0.419 as presented in the SU3 data package previously submitted. A summary of this re-evaluation is provided as Attachment 5.

Comment 2c: *What volume of clean soil will need to be brought in from off-site? What are the maximum and minimum depths of clean soil that will remain over the contamination soil once remediation is complete?*

Response: During site remediation, a total of approximately 4,100 yards was shipped for disposal which will have to be replaced from off-site. Based upon the footprint as excavated, the depth covering the trenches and any soils replaced (i.e., "clean" overburden and the 27 bags remaining on site) would be 1.67 meters or approximately 5 feet on average. It should be noted that the method of backfill using on-site soils will be controlled such that the thickness of off-site soil used to cover any replaced soils will be relatively uniform.

If you have any further question or comments regarding our responses, please let me know at mcarr@energysolutions.com or 865-425-4587.

Respectfully,

Michael A. Carr, CHP
Radiation Safety Officer
Energy*Solutions*
Global Commercial Group Ops
865-425-4587

Cc: Art Palmer
Glenn Centola
William Snell, NRC Region III
Peter Lee, NRC Region III
Christine Lipa, NRC Region III

Attachment 1
Sign Test Results – SU2 and SU3

Survey Unit	Measurements (N)	Sign Test (S+)	Critical Value (S_{Crit})	Pass / Fall
SU2				
Systematic - General	12	12	9	**PASS**
Systematic - Trenches	30	30	19	**PASS**
Systematic - Total	42	42	26	**PASS**
Biased [a]	3	1	NA	NA
SU3				
Systematic - General	12	12	9	**PASS**
Systematic - Trenches	36	33	23	**PASS**
Systematic - Total	48	45	30	**PASS**
Biased [a]	6	6	NA	NA

a Biased samples are not included in the Sign Test statistical evaluation. Biased samples are evaluated as part of the Elevated Measurement Comparison testing as applicable.

Attachment 2
Clean Overburden Sample Results

Sample ID	In-growth (days)	Depth (feet)	In- Situ Count Rate (cpm)	^{238}U		^{230}Th	^{226}Ra		^{232}Th		SOF
				Activity (pCi/g)	MDA (pCi/g)	Activity (pCi/g)	Activity (pCi/g)	MDA (pCi/g)	Activity (pCi/g)	MDA (pCi/g)	
Overburden Samples											
SU3OB001	85	0.000	NA	*6.88E-01*	7.04E-01	5.53E+00	**5.12E-01**	8.22E-02	**5.53E-01**	1.87E-01	0.21
SU3OB002	85	0.000	NA	*3.11E-01*	6.09E-01	7.10E+00	**5.56E-01**	1.06E-01	**7.10E-01**	1.60E-01	0.26
SU3OB003	85	0.000	NA	*3.27E-01*	8.41E-01	7.93E+00	**5.96E-01**	1.10E-01	**7.93E-01**	1.70E-01	0.28
SU3OB004	85	0.000	NA	*5.21E-01*	6.10E-01	1.00E+01	**7.70E-01**	1.15E-01	**1.00E+00**	2.64E-01	0.36
SU3OB005	85	0.000	NA	*2.54E-01*	5.69E-01	6.55E+00	**5.84E-01**	9.52E-02	**6.55E-01**	1.42E-01	0.25
SU3OB006	85	0.000	NA	*4.19E-01*	8.20E-01	7.51E+00	**5.31E-01**	1.14E-01	**7.51E-01**	2.05E-01	0.26
SU3OB007	85	0.000	NA	*5.74E-01*	5.92E-01	7.50E+00	**6.51E-01**	1.27E-01	**7.50E-01**	2.70E-01	0.28
SU3OB008	85	0.000	NA	*3.18E-01*	8.26E-01	5.67E+00	**5.54E-01**	1.15E-01	**5.67E-01**	1.91E-01	0.22
SU3OB009	86	0.000	NA	*6.70E-01*	7.92E-01	1.31E+01	**7.33E-01**	1.29E-01	**1.31E+00**	3.33E-01	0.43
SU3OB010	82	0.000	NA	*1.36E-01*	7.90E-01	6.23E+00	**5.46E-01**	1.04E-01	**6.23E-01**	1.41E-01	0.24
SU3OB011	82	0.000	NA	*4.82E-01*	6.27E-01	1.14E+01	**7.41E-01**	1.23E-01	**1.14E+00**	1.93E-01	0.39
SU3OB012	82	0.000	NA	*6.98E-01*	9.08E-01	8.52E+00	**6.55E-01**	1.07E-01	**8.52E-01**	2.17E-01	0.31
SU3OB013	82	0.000	NA	**1.31E+00**	8.50E-01	7.76E+00	**6.19E-01**	1.14E-01	**7.76E-01**	4.41E-01	0.29
SU3OB014	82	0.000	NA	**5.74E-01**	5.07E-01	4.80E+00	**4.48E-01**	9.16E-02	**4.80E-01**	1.35E-01	0.19
SU3OB015	82	0.000	NA	*4.91E-01*	7.25E-01	6.67E+00	**5.13E-01**	1.62E-01	**6.67E-01**	3.44E-01	0.24
SU3OB016	84	0.000	NA	*5.36E-01*	8.19E-01	6.09E+00	**5.82E-01**	1.13E-01	**6.09E-01**	2.48E-01	0.24
SU3OB017	84	0.000	NA	*6.09E-01*	6.28E-01	6.22E+00	**6.26E-01**	1.08E-01	**6.22E-01**	2.79E-01	0.25
SU3OB018	83	0.000	NA	*4.42E-01*	5.28E-01	5.85E+00	**5.90E-01**	1.13E-01	**5.85E-01**	2.33E-01	0.23
SU3OB019	83	0.000	NA	*1.58E-01*	8.54E-01	8.01E+00	**6.21E-01**	1.07E-01	**8.01E-01**	1.97E-01	0.29
SU3OB020	83	0.000	NA	*6.55E-01*	6.80E-01	8.47E+00	**5.69E-01**	9.99E-01	**8.47E-01**	2.46E-01	0.29
SU2OB021	0	0.000	NA	*2.26E-01*	7.35E-01	5.60E+00	**9.65E-01**	7.84E-01	**5.60E-01**	1.82E-01	0.29
SU2OB022	0	0.000	NA	*5.92E-01*	6.43E-01	7.68E+00	*8.00E-01*	8.47E-01	**7.68E-01**	1.73E-01	0.31
SU2OB023	0	0.000	NA	**1.47E+00**	1.02E+00	1.19E+01	*6.24E-01*	1.02E+00	**1.19E+00**	2.17E-01	0.38
SU2OB024	0	0.000	NA	**1.39E+00**	7.65E-01	1.56E+01	**1.27E+00**	1.23E+00	**1.77E+00**	1.91E-01	0.62
SU2OB025	0	0.000	NA	*7.28E-01*	9.33E-01	1.04E+01	*9.11E-01*	9.16E-01	**1.04E+00**	2.01E-01	0.40

Sample ID	In-growth (days)	Depth (feet)	In- Situ Count Rate (cpm)	^{238}U		^{230}Th	^{226}Ra		^{232}Th		SOF
				Activity (pCi/g)	MDA (pCi/g)	Activity (pCi/g)	Activity (pCi/g)	MDA (pCi/g)	Activity (pCi/g)	MDA (pCi/g)	
SU2OB026	0	0.000	NA	**7.93E-01**	6.95E-01	9.06E+00	*8.12E-01*	1.07E+00	**9.06E-01**	2.36E-01	0.35
SU2OB027	0	0.000	NA	**1.54E+00**	7.88E-01	6.18E+00	**1.52E+00**	1.33E+00	**1.68E+00**	3.08E-01	0.61
SU2OB028	0	0.000	NA	**9.33E-01**	6.91E-01	1.19E+01	**1.47E+00**	1.31E+00	**1.19E+00**	2.63E-01	0.52
SU2OB029	0	0.000	NA	*6.18E-01*	7.13E-01	1.07E+01	**1.09E+00**	9.45E-01	**1.07E+00**	1.12E-01	0.43
SU2OB030	0	0.000	NA	*4.22E-01*	6.00E-01	8.06E+00	**1.45E+00**	1.09E+00	**8.06E-01**	2.44E-01	0.43
SU2OB031	0	0.000	NA	*2.71E-01*	5.37E-01	6.68E+00	*3.01E-01*	8.45E-01	**6.68E-01**	1.75E-01	0.21
SU2OB032	0	0.000	NA	*5.78E-01*	8.45E-01	6.40E+00	*6.10E-01*	7.37E-01	**6.40E-01**	2.06E-01	0.25
SU2OB033	0	0.000	NA	*4.81E-01*	5.04E-01	5.67E+00	*7.50E-01*	1.28E+00	**5.67E-01**	1.52E-01	0.26
SU2OB034	0	0.000	NA	*7.47E-01*	7.70E-01	5.41E+00	*2.02E-01*	8.53E-01	**5.41E-01**	2.32E-01	0.16
SU2OB035	0	0.000	NA	*5.14E-01*	5.29E-01	3.80E+00	*7.04E-01*	8.55E-01	**3.80E-01**	2.36E-01	0.20
SU2OB036	0	0.000	NA	*5.36E-01*	5.49E-01	6.84E+00	**1.30E+00**	1.02E+00	**6.84E-01**	2.21E-01	0.37
SU2OB037	0	0.000	NA	*2.14E-01*	7.59E-01	4.71E+00	*2.37E-01*	7.14E-01	**4.71E-01**	2.37E-01	0.15
SU2OB038	0	0.000	NA	**9.91E-01**	8.19E-01	5.77E+00	*5.94E-01*	1.03E+00	**5.77E-01**	2.46E-01	0.23
SU2OB039	2	0.000	NA	*7.67E-01*	8.62E-01	5.50E+00	*8.34E-01*	9.27E-01	**5.50E-01**	2.81E-01	0.27
SU2OB040	0	0.000	NA	**9.55E-01**	8.13E-01	4.43E+00	*4.40E-01*	1.01E+00	**4.43E-01**	2.79E-01	0.18
SU2OB041	2	0.000	NA	**6.73E-01**	5.77E-01	5.41E+00	*2.28E-01*	7.73E-01	**5.41E-01**	2.21E-01	0.17
SU2OB042	2	0.000	NA	*1.11E-01*	9.03E-01	6.22E+00	**1.22E+00**	8.57E-01	**6.22E-01**	2.36E-01	0.34
SU2OB043	2	0.000	NA	**6.24E-01**	5.44E-01	5.74E+00	**1.09E+00**	7.94E-01	**5.74E-01**	1.97E-01	0.31
SU2OB044	2	0.000	NA	*4.24E-01*	8.52E-01	6.33E+00	*7.20E-01*	8.49E-01	**6.33E-01**	2.88E-01	0.27
SU2OB045	2	0.000	NA	*5.54E-01*	5.66E-01	6.07E+00	*4.16E-01*	8.38E-01	**6.07E-01**	1.67E-01	0.21
SU2OB046	1	0.000	NA	*1.80E-01*	7.86E-01	5.76E+00	**1.20E+00**	1.01E+00	**5.76E-01**	2.40E-01	0.33
SU2OB047	2	0.000	NA	**1.04E+00**	8.06E-01	7.15E+00	*3.60E-01*	9.36E-01	**7.15E-01**	2.72E-01	0.23
SU2OB048	0	0.000	NA	*3.21E-01*	5.35E-01	4.86E+00	*2.98E-01*	9.26E-01	**4.86E-01**	2.49E-01	0.16
SU2OB049	0	0.000	NA	*8.32E-01*	9.01E-01	7.67E+00	**1.43E+00**	1.18E+00	**7.67E-01**	2.49E-01	0.41
SU2OB050	0	0.000	NA	*4.65E-01*	7.74E-01	6.08E+00	**1.17E+00**	9.35E-01	**6.08E-01**	2.30E-01	0.33
SU2OB051	0	0.000	NA	**7.46E-01**	6.40E-01	7.16E+00	*5.45E-01*	8.07E-01	**7.16E-01**	2.49E-01	0.26
SU2OB052	0	0.000	NA	**6.87E-01**	5.86E-01	6.78E+00	*3.56E-01*	7.95E-01	**6.78E-01**	2.40E-01	0.22
SU2OB053	0	0.000	NA	**8.30E-01**	5.45E-01	7.34E+00	*1.01E+00*	1.08E+00	**7.34E-01**	2.47E-01	0.34
SU2OB054	1	0.000	NA	*3.40E-01*	8.52E-01	7.71E+00	*6.95E-01*	8.90E-01	**7.71E-01**	1.15E-01	0.30
SU2OB055	1	0.000	NA	**8.24E-01**	6.01E-01	1.72E+00	**1.02E+00**	8.83E-01	**6.87E-01**	2.49E-01	0.31
SU2OB056	0	0.000	NA	*4.35E-01*	8.98E-01	9.23E+00	**1.26E+00**	8.86E-01	**9.23E-01**	2.31E-01	0.42

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Sample ID	In-growth (days)	Depth (feet)	In- Situ Count Rate (cpm)	^{238}U Activity (pCi/g)	^{238}U MDA (pCi/g)	^{230}Th Activity (pCi/g)	^{226}Ra Activity (pCi/g)	^{226}Ra MDA (pCi/g)	^{232}Th Activity (pCi/g)	^{232}Th MDA (pCi/g)	SOF
SU2OB057	0	0.000	NA	*5.10E-01*	7.25E-01	5.53E+00	**1.05E+00**	8.62E-01	**5.53E-01**	1.81E-01	0.30
SU2OB058	0	0.000	NA	*6.45E-01*	8.50E-01	6.75E+00	*4.81E-01*	8.17E-01	**6.75E-01**	2.39E-01	0.24
SU2OB059	0	0.000	NA	*4.96E-01*	7.78E-01	6.45E+00	*7.05E-01*	8.80E-01	**6.45E-01**	2.33E-01	0.27
SU2OB060	1	0.000	NA	*7.01E-01*	8.60E-01	6.25E+00	*1.86E-01*	8.43E-01	**6.25E-01**	2.33E-01	0.18
SU2OB061	1	0.000	NA	*4.72E-01*	9.91E-01	7.42E+00	**1.08E+00**	9.92E-01	**7.42E-01**	2.83E-01	0.35
SU2OB062	1	0.000	NA	*4.95E-01*	8.13E-01	5.96E+00	*9.52E-01*	9.67E-01	**5.96E-01**	2.27E-01	0.30
SU2OB063	1	0.000	NA	*4.46E-01*	8.72E-01	7.44E+00	**1.48E+00**	9.91E-01	**7.44E-01**	2.25E-01	0.42
SU2OB064	1	0.000	NA	*3.99E-01*	6.22E-01	6.79E+00	**1.03E+00**	9.14E-01	**6.79E-01**	1.54E-01	0.33
SU2OB065	1	0.000	NA	**4.98E-01**	4.59E-01	5.65E+00	**8.70E-01**	7.94E-01	**5.65E-01**	2.28E-01	0.28
SU2OB066	1	0.000	NA	*3.01E-01*	8.12E-01	6.62E+00	*6.40E-01*	8.19E-01	**6.62E-01**	2.12E-01	0.26
SU2OB067	1	0.000	NA	*2.66E-01*	4.70E-01	6.32E+00	**8.78E-01**	7.52E-01	**6.32E-01**	1.49E-01	0.29
SU2OB068	2	0.000	NA	*4.19E-01*	5.42E-01	5.77E+00	*1.13E+00*	1.13E+00	**5.77E-01**	2.24E-01	0.32
SU2OB069	2	0.000	NA	*1.35E-01*	5.10E-01	7.01E+00	*7.88E-01*	8.20E-01	**7.01E-01**	1.94E-01	0.29
SU2OB070	2	0.000	NA	**9.57E-01**	5.36E-01	6.67E+00	*9.76E-01*	9.81E-01	**6.67E-01**	2.30E-01	0.32
SU2OB071	0	0.000	NA	**9.03E-01**	6.37E-01	4.88E+00	*8.93E-01*	1.42E+00	**1.04E+00**	2.29E-01	0.37
SU2OB072	0	0.000	NA	**7.02E-01**	6.60E-01	6.04E+00	*7.81E-01*	1.12E+00	**6.04E-01**	2.22E-01	0.27
SU2OB073	0	0.000	NA	*7.29E-01*	9.02E-01	6.30E+00	*3.25E-01*	8.33E-01	**6.30E-01**	1.68E-01	0.20
SU2OB074	0	0.000	NA	**1.32E+00**	9.24E-01	5.72E+00	*4.53E-02*	1.09E+00	**5.72E-01**	2.03E-01	0.15
SU2OB075	0	0.000	NA	*3.68E-01*	9.66E-01	6.39E+00	**9.80E-01**	9.06E-01	**6.39E-01**	1.69E-01	0.31
SU2OB076	0	0.000	NA	*5.14E-01*	7.45E-01	6.88E+00	*5.67E-01*	8.47E-01	**6.88E-01**	1.64E-01	0.26
SU2OB077	0	0.000	NA	*5.49E-01*	6.42E-01	5.56E+00	*9.04E-01*	1.02E+00	**5.56E-01**	2.20E-01	0.28
SU2OB078	0	0.000	NA	**6.54E-01**	5.76E-01	6.78E+00	*2.62E-01*	9.97E-01	**6.78E-01**	1.75E-01	0.20
SU2OB079	0	0.000	NA	*8.56E-01*	8.86E-01	6.13E+00	*8.24E-01*	8.50E-01	**6.13E-01**	2.82E-01	0.28
SU2OB080	0	0.000	NA	*5.26E-01*	6.90E-01	5.61E+00	*7.42E-01*	8.47E-01	**5.61E-01**	2.34E-01	0.25
SU2OB081	0	0.000	NA	**7.78E-01**	6.00E-01	5.71E+00	*5.73E-01*	9.93E-01	**5.71E-01**	2.31E-01	0.23
		Average:		**6.01E-01**		**6.93E+00**	**7.54E-01**		**7.22E-01**		**0.29**
		Std Dev.:		**2.99E-01**		**2.07E+00**	**3.35E-01**		**2.38E-01**		
		UCL 95%:		**1.09E+00**		**1.03E+01**	**1.30E+00**		**1.11E+00**		
		Maximum:		**1.54E+00**		**1.56E+01**	**1.52E+00**		**1.77E+00**		

Note Bold values are values greater than MDA while italics are less than MDA.

Attachment 3
Background Soil Sample Results

Sample ID	In-growth (days)	Depth (feet)	In- Situ Count Rate (cpm)	^{238}U Activity (pCi/g)	^{238}U MDA (pCi/g)	^{230}Th Activity (pCi/g)	^{226}Ra Activity (pCi/g)	^{226}Ra MDA (pCi/g)	^{232}Th Activity (pCi/g)	^{232}Th MDA (pCi/g)	SOF
Background Samples											
BKGD01	71	0	7,216	*4.32E-01*	8.53E-01	5.98E+00	**6.23E-01**	1.21E-01	**5.98E-01**	2.51E-01	0.24
BKGD02	71	0	7,344	**5.35E-01**	5.18E-01	5.24E+00	**6.54E-01**	1.23E-01	**5.24E-01**	2.75E-01	0.23
BKGD03	71	0	6,247	**5.75E-01**	4.97E-01	4.27E+00	**4.84E-01**	1.97E-01	**4.27E-01**	2.66E-01	0.18
BKGD04	71	0	7,378	*3.19E-01*	7.94E-01	7.00E+00	**6.33E-01**	1.00E-01	**7.00E-01**	2.62E-01	0.27
BKGD05	71	0	7,428	*6.23E-01*	8.17E-01	5.71E+00	**6.35E-01**	1.16E-01	**5.71E-01**	1.82E-01	0.24
BKGD06	71	0	7,262	*5.77E-01*	8.65E-01	4.95E+00	**5.54E-01**	1.02E-01	**4.95E-01**	2.30E-01	0.21
BKGD07	71	0	7,180	*3.02E-01*	8.44E-01	6.93E+00	**5.68E-01**	1.21E-01	**6.93E-01**	2.15E-01	0.26
BKGD08	71	0	7,256	*5.83E-01*	8.23E-01	5.75E+00	**5.64E-01**	9.30E-02	**5.75E-01**	1.94E-01	0.23
BKGD09	72	0	7,136	*2.30E-01*	8.70E-01	6.75E+00	**6.10E-01**	1.25E-01	**6.75E-01**	2.00E-01	0.26
BKGD10	72	0	6,995	*6.85E-01*	8.28E-01	6.79E+00	**4.92E-01**	9.89E-02	**6.79E-01**	1.80E-01	0.24
BKGD11	72	0	5,857	*3.62E-01*	6.85E-01	3.33E+00	**4.45E-01**	1.98E-01	**3.33E-01**	2.08E-01	0.15
BKGD12	72	0	6,058	*6.87E-01*	7.37E-01	4.59E+00	*5.92E-01*	9.48E-01	**4.59E-01**	1.99E-01	0.21
BKGD13	72	0	6,848	*5.64E-01*	6.31E-01	6.49E+00	**5.78E-01**	1.14E-01	**6.49E-01**	2.64E-01	0.25
BKGD14	72	0	6,824	**7.93E-01**	7.85E-01	6.28E+00	**5.30E-01**	1.02E-01	**6.28E-01**	1.83E-01	0.24
BKGD15	73	0	6,865	**9.64E-01**	7.99E-01	5.81E+00	**5.50E-01**	1.02E-01	**5.81E-01**	1.62E-01	0.23
BKGD16	73	0	6,042	*3.48E-02*	7.17E-01	4.87E+00	**5.38E-01**	9.20E-02	**4.87E-01**	2.17E-01	0.20
BKGD17	73	0	6,716	*4.82E-01*	5.15E-01	4.34E+00	**6.01E-01**	9.53E-02	**4.34E-01**	2.10E-01	0.20
BKGD18	73	0	6,708	*2.57E-01*	8.15E-01	6.05E+00	**5.86E-01**	1.13E-01	**6.05E-01**	1.80E-01	0.24
BKGD19	73	0	6,865	*4.45E-01*	5.54E-01	5.98E+00	**6.24E-01**	1.27E-01	**5.98E-01**	2.03E-01	0.24
BKGD20	73	0	6,708	*6.00E-01*	8.60E-01	6.23E+00	**6.18E-01**	1.10E-01	**6.23E-01**	4.15E-01	0.25
		Average:	**6,847**	**5.02E-01**		**5.67E+00**	**5.74E-01**		**5.67E-01**		**0.23**
		Std Dev.:	**472**	**2.13E-01**		**1.00E+00**	**5.56E-02**		**1.00E-01**		
		UCL 95%:	**7,622**	**8.54E-01**		**7.32E+00**	**6.65E-01**		**7.32E-01**		
		Maximum:	**7,136**	**9.64E-01**		**7.00E+00**	**6.54E-01**		**7.00E-01**		

Note Bold values are values greater than MDA while italics are less than MDA

Attachment 4
27 Bags – Modeled Activities (Microshield)

	^{238}U (pCi/g)	^{230}Th (pCi/g)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	SOF [a]
Average	2.97	58.2	2.97	5.94	0.715
Maximum	4.17	81.6	4.17	8.33	0.996

a The SOF is based upon the subsurface DCGLs, depth greater than 1.5 meters.

Attachment 5
SU3 EMC Test – Re-evaluation

Area	Size m^2	SOF_{Avg}	f_{Area} %	SOF [a]
Trenches	215	0.715	0.131	0.094
Balance of SU3	1427	0.243	0.869	0.211
EMC1 [b]	24.1	0.063	NA	0.063
EMC2 [b]	10.6	0.060	NA	0.060
EMC3 [b]	10.1	0.063	NA	0.063
EMC4 [b]	2.9	0.033	NA	0.033
				0.524

a SOF contribution for the Trenches and Balance of SU3 were determined using a weighted average based upon feature size.

b EMC data was taken from the SU3 data submittal.

Bonano, Eugenio

From: Snell, William
Sent: Thursday, May 19, 2011 9:23 AM
To: 'Mike Carr'
Cc: 'gscentola@energysolutions.com'; Bonano, Eugenio; Lee, Peter
Subject: RE: SU2 Response

Mike,

Overall the response was fine. Peter had the following 2 questions, of which I thought the answer to #1 was yes, that the top 1.5 m (5 ft) would be clean soil, but please verify.

1. Please confirm that for excavation exceeding 1.5 m, at least 1.5 m below grade surface will be backfilled with off-site clean soil, and for excavation less than 1.5 m, only off-site clean soil will be used to backfill.

2. Describe how to dump, level, survey, sampling then backfill the 27 bags contaminated soil. The soil concentration of 27 bags should rely on sampling, not exposure rate measurements then applying MicroShield for concentration assessment.

It has also come up in discussions in the Region that we only did a partial confirmatory survey of SU2 (i.e., surface scanning only, nothing in the trenches). Christine wants additional surveys, so before you backfill SU2 we'll need to conduct another survey.

Last, what is the status of the discharge permit? That seems to be what is critical path for completing this project but no-one appears to know approximately when it will be issued. We are anxious to see this project moving and if we need to make some calls we will, but we need to know who is doing what.

Bill Snell
630-926-1250

From: Mike Carr [mailto:MCARR@energysolutions.com]
Sent: Monday, May 16, 2011 5:07 PM
To: Bonano, Eugenio; Snell, William
Subject: SU2 Response

Have either of you had a chance to look at the response that was submitting in regards to Bills email on the status of SU2 and SU3? Do you have any further questions?

Michael Carr, CHP
Radiation Safety Officer
Global Commercial Group Ops
Energy*Solutions*
865-425-4587

Bonano, Eugenio

From: Mike Carr [MCARR@energysolutions.com]
Sent: Friday, May 20, 2011 3:55 PM
To: Bonano, Eugenio; Snell, William
Cc: Art Palmer; Jim Allen; Lee, Peter; Glenn S. Centola; Lipa, Christine
Attachments: 05-19-2011 NRC Comment Response.pdf

Attached you will find the response to the two questions as provided in the latest email from Bill Snell.

Additionally, we are still working with the State in regards to the water on site and we will keep you posted.

Michael Carr, CHP
Radiation Safety Officer
Global Commercial Group Ops
Energy*Solutions*
865-425-4587

ENERGY*SOLUTIONS*

May 20, 2011

U.S. Nuclear Regulatory Commission, Region III
Attn: Eugenio Bonano
2443 Warrenville Rd
Suite 210
Lisle, IL 60532-4352

RE: NRC Comment Response; E-mail dated May 19th 2011 from William Snell – RE: SU2 Response

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Energy*Solutions* has reviewed the additional comments from the NRC as provided in the e-mail as referenced above. The following text provides Energy*Solutions*' responses regarding these additional questions concerning our initial comment response dated May 6th, 2011.

Comment 1: *Please Confirm that for the excavation exceeding 1.5m, at least 1.5m below grade surface will be backfilled with off-site clean soil, and for excavation less than 1.5m, only off-site clean soil will be used to backfill.*

Response: Based upon Energy*Solutions* calculations using the estimated excavation footprint and the volumes of soils from the "clean" overburden pile and the 27 bags remaining on site, it is estimated that any soils placed back in the excavation will have 1.5m of clean off-site soil overburden placed on top. The soils from the 27 bags will be placed in the bottoms of the trenches in SU3 not to exceed 2 feet in depth as described in our prior response on May 6th and will be well below 1.5m bgs. In regards to the "clean" overburden on-site; all of the overburden should fit at or below the 1.5m bgs level; however, some of the soil may not have a full 1.5m of off-site overburden. As noted in the prior response, the "clean" overburden data was presented along with the background study to show that the on-site overburden that was removed to aid in site remediation was in fact close to background levels (approximately 15% higher on average). To aid in the backfill, Energy*Solutions* will mark off the areas that have been excavated greater than 1.5m bgs and delineate the area using marking paint to aid in the backfill to help ensure any on-site soils are replaced at or below the 1.5m bgs level to the maximum extent possible.

Comment 2: *Describe how to dump, level, survey, sample and backfill the 27 bags of contaminated soil. The soil concentration of the 27 bags should rely on sampling, not exposure rate measurements then applying MicroShield® for concentration assessment.*

Response: Energy*Solutions* understands that more definitive data will be required regarding these 27 bags of soil and that soil sampling will be performed prior to placing the soil back into the excavation. The dose modeling was used as part of the waste assessment during site

remediation and was used as a preliminary assessment on returning the soils from these bags to the bottom of the trenches in SU3.

In order to confirm the use of these soils, the bags will be opened and the soil dumped in an area in SU1, leveled to a thickness at or about 1 foot thick and a walkover scan performed. Based upon the walkover, composite soil samples will be collected at a frequency of about 1 sample per bag which is roughly equivalent to the trench sampling protocols. Assuming one sample every 10 linear feet, a trench width of approximately 5 feet and the soils not to exceed 2 feet thick, this would result in one sample for roughly each 4 cubic yards or one composite sample per bag. The walkover data and soil sampling results will be assessed and the data used as a separate elevated measurement area and added to the prior SU3 EMC evaluation presented in the SU3 data package as part of the final SU3 evaluation.

Once cleared to be used (i.e., below the subsurface DCGLs) the excavator will be used to transport the soils back to SU3 and placed in the bottoms of the trenches. To ensure these soils do not exceed the modeled CZ thickness within the trenches, the trenches will be marked using marking paint to ensure these soils do not exceed 2 feet in depth.

If you have any further question or comments regarding our responses, please let me know at mcarr@energysolutions.com or 865-425-4587.

Respectfully,

Michael A. Carr, CHP
Radiation Safety Officer
Energy*Solutions*
Global Commercial Group Ops
865-425-4587

Cc: Art Palmer
Glenn Centola
William Snell, NRC Region III
Peter Lee, NRC Region III
Christine Lipa, NRC Region III

Bonano, Eugenio

From: Bonano, Eugenio
Sent: Thursday, June 16, 2011 1:15 PM
To: 'Mike Carr'
Cc: 'William Snell'; Lee, Peter; Lipa, Christine; LaFranzo, Michael; 'Mike McCann'; McCann, Mike; Slawinski, Wayne; 'Art Palmer'; 'corneliuss@michigan.gov'; 'toneill@foley.com'
Subject: RE: NRC Response

Mike,

We have no further questions or comments regarding your e-mail responses dated May 6, 2011 and May 20, 2011 to NRC e-mails dated April 29, 2011 and May 19, 2011 from William Snell – RE: NRC comments regarding FSSR Breckenridge Disposal Site Survey Packages for SU-2 and SU-3.

After removal of the water and before backfilling, NRC inspectors will conduct confirmatory surveys of SU-2, do a quick scan of SU-3 to verify conditions haven't changed as a result of standing water, and afterwards observe the backfill activities to verify work is done in accordance with the work plan and commitments made in the responses.

Any questions or concerns please contact me or Bill Snell.

Sincerely,

Eugenio (Gene) A. Bonano, M.S., Health Physicist
U.S. Nuclear Regulatory Commission
RIII/DNMS/MCID Branch
2443 Warrenville Rd, Suite 210
Lisle, IL 60532-4352
Tel: 630-829-9826
Fax: 630-515-1259
e-mail: eugenio.bonano@nrc.gov

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

From: Mike Carr [mailto:MCARR@energysolutions.com]
Sent: Thursday, June 02, 2011 10:09 AM
To: Bonano, Eugenio; Snell, William
Subject: NRC Response

Eugenio and Bill,

Have you had a chance to look at and review our response to the latest comments regarding the backfill, overburden and the 27 bags of material on site?

Michael Carr, CHP
Radiation Safety Officer
Global Commercial Group Ops
Energy*Solutions*

Bonano, Eugenio

From: Mike Carr [MCARR@energysolutions.com]
Sent: Thursday, June 23, 2011 9:41 AM
To: Bonano, Eugenio
Cc: Art Palmer
Subject: RE: FSSR Survey Packages for SU-2 and 3

The Survey Packages as sent are final version as stand alone documents. These will be rolled into the Final Survey document at the end of the project once everything is complete.

From: Bonano, Eugenio [mailto:Eugenio.Bonano@nrc.gov]
Sent: Thursday, June 23, 2011 10:14 AM
To: Mike Carr
Subject: FSSR Survey Packages for SU-2 and 3

Mike, what you sent us to review was in final and not a draft copy,...correct? ...and that the survey packages will be part of the FSSR. Can you let me know ASAP, I need to make sure draft copies do not make it into our public filing database, ADAMS.

Eugenio (Gene) A. Bonano, *M.S., Health Physicist*
U.S. Nuclear Regulatory Commission
RIII/DNMS/MCID Branch
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Protecting People and the Environment