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October 17, 2008

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Dear Sirs:

The California Department of Toxic Substances Control (DTSC), assisted by the California Department of Public Health's Radiologic Health Branch, has completed its review of the 41 documents submitted by Runkle Canyon, LLC pursuant to the California Land Reuse and Revitalization Act (CLRRA) agreement (Docket No. HAS-CLRRA-07/08-160) executed between DTSC and Runkle Canyon, LLC in April 2008. Those 41 documents consist of reports and letters that explain and summarize investigations that occurred at the project site between 1999 and 2007. Today's letter comments on the documents reviewed, prescribes additional work necessary to complete the assessment of environmental conditions at Runkle Canyon, and requests that Runkle Canyon, LLC prepare a Response Plan to address the concerns summarized at the end of this letter.

## 1. Potential Radiologic Contamination from Santa Susana Field Lab (SSFL)

Several investigations were performed to evaluate whether the site is contaminated with radiologic elements from the nearby SSFL. The elements of concern are strontium 90 (Sr-90), cesium 137 (Cs-137), and tritium. Analytical results from samples collected at Runkle Canyon indicated that Cs-137 and tritium were not problems. However, results from the Sr-90 sampling are not consistent. The early sampling analyses (1998-2003) had detection limits that allowed comparisons to the typical U.S. background for Sr-90 in soil of 0.7 pCi/g but the detection limits were too high to allow comparison to the local

background of 0.052 pCi/g. Some Sr-90 sample results were above both background levels. Subsequent testing showed much lower levels, and a risk assessment prepared by a consultant to Runkle Canyon, LLC indicated that based on the more recent data, there is no elevated human health risk.

Several investigations that included sample collection for radioactive elements have been conducted on the Runkle Canyon property. The most complete discussion of radiologic conditions and investigations is in Document #5 prepared by Dade Moeller and Associates in 2005.[1] The first investigation that included radiologic testing was performed by QST Environmental in 1999 and is described in Document #38. That investigation consisted of analyzing four soil samples for Sr-90, Cs-137, and tritium. Based on Sr-90 detections, the report concluded that the Runkle Canyon property may have been affected by SSFL activities and recommended further investigation to evaluate the lateral and vertical extent of radiologic compounds, and determine naturally-occurring conditions for those compounds.

The next radiologic investigation was performed by Foster Wheeler in 1999, and is described in Document #24. The purpose of that investigation was to address the concerns raised in the QST report, determine radiologic conditions across the site, and evaluate areas downgradient of SSFL for radiologic contamination. Fifty-eight (58) soil samples were collected in a triangular grid across the site. The number of samples and the grid configuration were determined using the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). The methods presented in the MARSSIM are endorsed by U.S. EPA. In addition to these 58 soil samples, an additional nine samples were collected to evaluate areas downgradient of the SSFL where contamination would be suspected. These were referred to as the "discretionary" samples. The report references 12 discretionary sample locations and states that locations that were already part of the site-wide sampling were excluded. The table summarizing the discretionary samples lists nine samples, so it appears that three of the discretionary sampling locations are included in the site-wide sampling. The report concluded that, based on the surface soil sampling that was conducted, the site is considered to be non-contaminated for the radionuclides detected.

In 2000, Harding ESE performed an additional investigation to determine if operations conducted at SSFL had impacted on-site soils based on surface run-off carrying radionuclides to the site. The investigation is described in Document #8. A total of 19 soil samples were collected at 17 locations, and duplicate samples were collected at

[1] Document numbers cited throughout this letter correspond to the document list in section 3.3 of the aforementioned CLRRA agreement.

two of the locations. The sampling locations were selected to evaluate areas with the highest probability of being impacted with radionuclides from SSFL. Consequently, the sampling locations included on-site drainage washes originating near SSFL, access road drainage ditches, and low-lying areas. Based on the radionuclide testing, Harding ESE concluded that, while not dispositive, the data collected provide some indication that the site is not contaminated with Sr-90.

The Foster Wheeler (1999) report concludes that the site is "noncontaminated" and the Harding ESE (2000) report states there is "...some indication (but non-conclusive) that the site is not contaminated...". However, the data indicate some levels of Sr-90 above both typical U.S. background and the local background.

Miller Brooks Environmental, Inc. (MBE) performed three different investigations to evaluate radionuclides on the Runkle Canyon property. One of the investigations, described in Document #36, consisted of readings taken with a handheld Geiger counter at three locations, and then having a certified health physicist review the readings. This investigation concluded that the readings measured at these three locations were within the range of normal background readings. Due to the testing method that was used and the sparse number of locations, this is not a reliable survey and should not be counted on to evaluate radionuclide concentrations on the Runkle Canyon property.

In 2003, MBE performed an investigation to verify results of the Sr-90 testing that Harding ESE performed in 2000. That investigation is described in Document #13, a site investigation report prepared by MBE. MBE collected 17 surface soil samples in approximately the same locations as the Harding ESE surface samples and 10 subsurface soil samples; in addition MBE also collected nine water samples for tritium which showed only background levels to be present. Sr-90 was detected in two soil samples and was non-detect in all of the others. The Sr-90 detections were 2.10 (+/- 1.20) picocuries/gram (pCi/g) and 2.20 (+/- 1.20) pCi/g. The minimum detectable activity (MDA) of the non-detect samples ranged from 2.00 pCi/g to 2.8 pCi/g. The report concluded that the Sr-90 concentrations were either below detectable concentrations or below levels considered to pose health risk. However, the data do not appear useable for a risk assessment due to the high MDAs. Document #14 is a report prepared by MBE that describes a similar investigation on an adjacent portion of the Runkle Canyon property. In this investigation Sr-90 was not detected at MDAs ranging from 2.00 pCi/g to 2.8 pCi/g. As in the other report, it appears that the MDAs from these analyses were too high to be useful in a risk assessment. The 2003 MBE survey report conclusion that no detectable concentration of Sr-90 was found in surface soil and

shallow soil samples is not supported by the information in the report. There were two soil samples that exceeded Sr-90 background (0.05 pCi/g Sr-90) and MDA (2.2 pCi/g of Sr-90).

A risk assessment, Document #5, was performed by Dade Moeller & Associates, Inc. using data from the QST, Foster Wheeler and Harding ESE investigations. Data from the MBE investigations were not used in the risk assessment due the MDAs being too high to provide definitive information. The risk assessment includes discussions of the previous data, radiologic health risks, resident scenarios, and procedures for using the U.S. EPA default preliminary remediation goals (PRGs). Based on the risk assessment, the residential radiological health risk associated with the proposed development due to Sr-90 would be less than $1x10^{-6}$. Dade Moeller calculated the $1x10^{-6}$ risk to be 18.6 pCi/g for a typical resident and 1.1 pCi/g for a highly exposed resident using site-specific parameters.

In September 2007 an additional soil sampling campaign was conducted in the proposed residential area and the northwest area of the site (Document #7). A total of 63 soil samples were collected at random sampling locations determined using the MARSSIM approach. Six locations included both shallow and deep samples. This study had an average MDA of 0.02 pCi/g which was much lower than the previous studies. Sample results were also much lower than earlier studies, ranging from -0.001 to 0.078 pCi/g which are comparable to and generally less than the local background 0.052 pCi/g. Based on these results the report stated the potential annual health risk to future residents to be less than $1 \times 10^{-6}$ and that no further soil sampling for Sr-90 would be necessary.

**2. Perchlorate in Groundwater**

In 2004, MBE collected samples from soil borings as part of an investigation to sample for perchlorate and other organic and inorganic compounds. Perchlorate was detected in two samples that consisted of silt and groundwater. The samples were the result of trying to collect groundwater samples from a hollow stem auger once the augers were advanced to the water table. The laboratory that analyzed the samples classified them as soil and presented the results in µg/kg. The two samples contained perchlorate at concentrations of 50 and 60µg/kg. Details regarding the site investigation and analytical results are presented in Document #16. Based on the perchlorate detection, the Los Angeles Regional Water Quality Control Board (LARWQCB) issued a letter dated February 26, 2004 requesting information regarding potential sources on the Runkle Canyon site, and the installation and sampling of two groundwater wells.

In response to the LARWQCB letter, MBE installed two groundwater wells and sampled them five times. Perchlorate was detected once at a trace level, 0.33 µg/l, in one duplicate sample. Data validation was performed by a third party, and the validation report indicated that the detection was consistent with laboratory error, due to the wrong elution time being used to identify perchlorate along with interference from other compounds. The LARWQCB issued a letter on November 29, 2006, Document #40, requesting that the two wells be made available to the Army Corp of Engineers to help in a region-wide perchlorate study. None of the documents indicate whether the Army Corp of Engineers ever utilized the wells. On April 5, 2007, the LARWQCB issued a letter concluding that perchlorate was not considered a potential risk to human health or groundwater resources in Runkle Canyon.

The wells were also tested for volatile organic compounds (VOCs) and N-nitrosodimethylamine (NDMA). Some VOCs and NDMA were detected at very low concentrations. However, the concentrations detected were well below maximum contaminant concentrations for VOCs and the California Department of Public Health response level for NDMA. Consequently, the LARWQCB concluded that VOCs and NDMA were not considered a potential risk to human health or groundwater resources in Runkle Canyon, and on April 5, 2007 the LARWQCB issued a letter, Document #28, giving approval to abandon the wells. Allowing for the possibility that DTSC may request additional sampling, Runkle Canyon, LLC has not abandoned the wells. There is nothing in the documents to indicate the sampling or analytical testing regarding these wells were in error or inaccurate. DTSC concurs with the April 5, 2007 LARWQCB letter and does not recommend any additional investigation to evaluate if perchlorate is present in groundwater.

**3. White Crystalline Material**

A white crystalline material has been observed at Runkle Canyon in the area of the creek bed that runs down the middle of the site and at the base of spoils piles left from the previous on-site mining activity. Based on analyses of several samples of the white crystalline material, DTSC believes this material is a naturally-occurring evaporite salt. Early analytical testing indicated that the material contains different metals; however, the metals concentrations were not high enough to pose a threat to human health. It appears that this is the arsenic-containing material that the "Radiation Rangers" sampled in 2007. The material was re-sampled and splits were collected by the City of Simi Valley and the property owner's consultant. The sample splits did not contain elevated arsenic concentrations. A rock coated with white material and collected by

Radiation Rangers was found to contain elevated concentrations of chromium (Cr); however, no chain of custody was maintained.

The white crystalline material was noted in Document #39, the Ramco Phase I Report prepared in 1998. The Ramco report attributed the material to leaching from the surface mining aggregate stockpiles and recommended that the material be identified for regulatory compliance. Document #38 contains analytical results for the white substance. The report concludes that the analytical data indicate that the material consists mainly of metals and inorganic compounds that are normally nontoxic, and that because of a pH lower than average soils, additional investigative work is recommended. Document #24 provided analytical data from metals testing and results of X-Ray diffraction analyses to determine the crystal structure of the material. A total of 13 soil samples were analyzed for metals concentrations and 2 samples were analyzed for crystal structure/mineral identification. The metals analyses did not detect metals at concentrations greater than corresponding PRGs. The X-Ray diffraction tests indicated that the material consists of hexahydrite and konyaite, two naturally-occurring evaporite minerals comprising magnesium sulfate. The main difference between the two minerals is that konyaite contains sodium, whereas hexahydrite does not. Hexahydrite is essentially identical to Epsom salt, which is also a form of magnesium sulfate. The difference between the two is that Epsom salt incorporates seven molecules of water in its crystal structure, while hexahydrite incorporates six molecules.

**4. Surface Mining**

Surface mining is first mentioned in Document #39. Mining aggregate piles are mentioned as being unstable for building, and white crystalline material was noted near the base of the piles. The report also noted that some Class III (municipal) wastes had been disposed of in the aggregate piles.

Surface mining was performed at the Runkle Canyon site for sand and gravel products, and spoils piles of mined material are present in the proposed development area. Investigations performed by consultants for Runkle Canyon, LLC and a previous developer did not produce any data indicating threats to human health or the environment as a result of the mining activities. Ventura County has certified that the mine was properly closed and the area reclaimed. Remnants from the mining activity include spoils piles, some containing trash and debris, and several power poles that held transformers. Soil at the base of all of the power poles that held transformers was analyzed for polychlorinated biphenyls (PCBs). None of the soil samples had detectable concentrations of PCBs.

A report by MBE in May 2003, Document #9, describes sampling done to assess some asphalt material that was partially buried in the aggregate pile. Analysis for metals, total petroleum hydrocarbons (TPH), VOCs, polycyclic aromatic hydrocarbons (PAHs) and PCBs did not detect any elevated concentrations and it was concluded that the asphaltic material was part of an old roadbed.

Document #41 prepared by Geocon describes the assessment of tarry material contained within the mining aggregate piles. In 1995 Geocon performed some trenching in the aggregate piles to evaluate the nature and distribution of some tarry material that was seeping from the piles. The tarry material was mixed with sand and gravel. Seven trenches were excavated and the tar was found in one of the trenches. The volume of tarry material was estimated at 12 cubic yards. A sample of the tar was collected and analyzed for TPH, carbon range speciation, VOCs, and PAHs. Benzene, toluene, and ethylbenzene were detected at concentrations of 35, 62 and 27 µg/kg, respectively. No other VOCs were detected. Benzo(a)anthracene and chrysene were the only PAHs detected, and the combined B(a)P equivalent was 0.0025 mg/kg, which is below the PRG for benzo(a)pyrene of 0.006 mg/kg. However, it appears that the B(a)P conversion was improperly done and the tarry substance does in fact exceed the PRG. The Geocon report concluded that the tar appears to be asphalt or asphalt cement, and does not pose a recognized environmental hazard. Due to being unsuitable for use in fill, the report recommends removing the tarry material and disposing of it in a Class III landfill or a recycling facility. DTSC concurs with the recommendation of removing the tarry material.

**5. Oil and Gas Wells**

Document #37 is a letter written by MBE that summarized their search of California Department of Oil, Gas and Geothermal Resources records to determine if any oil or gas walls were present on the Runkle Canyon property. Based on its records review, MBE concluded that there were no oil gas wells present on the Runkle Canyon site. Five wells were located near the Runkle Canyon property, but all five have been abandoned, and they were all located northwest of the Runkle Canyon property with the closest well location being about 250 feet away from the property line. The MBE letter contains backup information such as copies of the Division of Oil, Gas and Geothermal Resources well records and a well location map.

## FURTHER ACTIONS

Based on its review of the 41 documents, DTSC concludes that additional work is necessary to better define environmental conditions at the site and to address one or more potential threats to public health and the environment. DTSC requests that Runkle Canyon, LLC prepare a Response Plan addressing these needs. Here is DTSC's prescription for that Response Plan:

### Radionuclide Testing

(1) Explain the reason(s) for the apparent decrease in residual Sr-90 soil activity from 1998 to 2007.

(2) Provide additional justification for statements made in Document #7 that "The overall conclusion is that there is effectively no health risk from Sr-90 in Runkle Canyon soil," and "No further sampling of soils at Runkle Canyon for the detection of Sr-90 is necessary". The information you provide should address MARSSIM area classification(s), the justification(s) for the classification(s), sample density calculations, and non-parametric statistics. Runkle Canyon, LLC should consider including provisions for additional radionuclide testing in the Response Plan. This aspect of the Response Plan should at a minimum, specify sample locations, the number of samples to be collected at each location, the analytical methods to be used, the detection limits to be used, and a justification for the proposed level of sampling.

(3) Explain why Cs-137 soil radioactivity was not present (above background) when Sr-90 was identified. If no reasonable explanation can be given, the Response Plan should include provisions for testing to identify Cs-137 and determine ratios of Cs-137 to Sr-90 in soil.

### White Crystalline Material

The white crystalline material appears to be sulfate salts leaching out of the mined aggregate stockpiles. Because the material on the rock obtained from the "Radiation Rangers," containing elevated Cr, the material on-site should be collected and analyzed for metals concentrations and mineral composition to verify Cr concentrations in the material and provide a positive identification of the material. DTSC plans to independently collect and analyze representative samples of the white material for those purposes. If the results are positive, it will then be necessary for Runkle Canyon, LLC to map the location(s) and extent of the material, prior to the 2008-2009 rainy

season, in preparation for possible removal and disposal or other corrective action. If the results confirm Cr or other metals are present at concentrations deemed actionable and the material cannot be mapped ahead of the forthcoming wet season, DTSC will direct that measures be taken to prevent the material from dissolving and washing away. Such measures could include removal, or placement of a suitable temporary cover. The Response Plan should address this contingency.

**Tar Material**

The tar material encountered at the site poses a potential threat to human health because benzo(a)anthracene concentrations exceed the PRG. The tar material should be removed from the site and either properly recycled or disposed. The Response Plan should address the removal of this material.

See section 5.3 of the CLRRA agreement for additional information regarding the Response Plan. If you have any questions regarding the above, please contact me at (916) 327-8642 or Ms. Nancy Bothwell Long at (916) 324-3154.

Sincerely,

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