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Radioactive Contamination at Runkle Ranch from the Santa Susana Field Laboratory

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**RADIOACTIVE CONTAMINATION
AT RUNKLE RANCH
FROM THE
SANTA SUSANA FIELD LABORATORY**

**BY
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DECEMBER 2006

**PREPARED WITH SUPPORT FROM THE
CITIZENS MONITORING AND TECHNICAL ASSESSMENT FUND**

¹ The assistance of research assistant Emily Churg is gratefully acknowledged.

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Runkle Ranch is the site of a proposed residential development in Simi Valley. Because it is located near to, and below, the Santa Susana Field Laboratory ((SFL), a nuclear reactor and rocket testing and development facility with significant radioactive and chemical contamination, the developer arranged for a series of tests of soil and other environmental media. SSFL is operated for the U.S. government by the Rocketdyne Division of the Boeing Company. This report examines the results of the soil testing for radioactivity.

Runkle Ranch totals 1615 acres, consisting of three areas – a 550-acre parcel that is to be the site of the housing development, and a Southern 715-acre parcel and a Western 350-acre for use as open space and a possible golf course.

The Environmental Impact Report (EIR) that supported the approval of the project briefly addressed the potential for contaminants from SSFL to have impacted the Runkle Ranch land and concluded that this was not an issue. The EIR¹ noted that background levels of strontium-90 are “about 0.1 pico Curie per gram (pCi/g)” and went on to describe sampling results for the Runkle property:

Previous assessments of strontium-90 and tritium within the vicinity of the [Runkle Canyon] Specific Plan Area included a survey conducted by QST Environmental, Inc. in 1998. This study was conducted to determine if nuclear

¹ This and the following two quotes are from pp. 4.6-6 and 4.6-7 of the EIR.

reactor operations at the SSFL facility had impacted soil at the site through surface water runoff. Four soil samples at three were collected and analyzed for cesium-137, strontium-90 and tritium. One of the locations was within a natural drainage channel flowing from the locale of the SSFL facility towards the northeastern portion of the Specific Plan Area. The results of the survey indicated that the surface soil contained concentrations of cesium-137 and strontium-90 that exceeded background levels established by the EPA.

Because of the initial findings, followup sampling was initiated. As the EIR states:

Consequently, further testing was indicated. Tritium was also detected in the samples, but at concentrations below the EPA background levels. A limited radiation survey was conducted during subsequent testing and analysis in the Phase I ESA for the 550-acre parcel referenced in this section. This assessment found that radiation levels were within normal background levels. *Tritium and strontium-90 were not detected in any of the soil and groundwater samples at levels above normal background levels or at levels considered to pose a health risk.*

(emphasis added)

This conclusion is puzzling, because the actual measurements being cited for the proposition that none were above background nor above levels considered to pose a health risk show precisely the opposite. Rather than none of the samples being above background or health risk levels, ALL 58 of the 1999 follow-up strontium measurements exceeded the 0.1 pCi/gram background figure cited in the EIR (as we shall see, that figure is actually twice background), and virtually all exceed the EPA's Preliminary Remediation Goals (PRGs).

The 1998 QST Sampling

On 23 December 1998, a contractor of GreenPark Ventures, QST Environmental, took soil samples from three locations at Runkle Ranch. One sample apiece was taken from two of the locations, and two samples from a third (one at the surface and one at one foot beneath the surface), for a total of four soil samples. As stated in QST's report² to GreenPark Ventures:

The purpose of the investigation was to determine if operations conducted at the adjacent "Rocketdyne" facility had impacted on-site soils, based on surface run-off carrying radionuclides to the site. Results of the investigation would determine if further site investigation is necessary for the subject site.

² "Results of Preliminary Soil Sampling at Runkle Ranch in Simi Valley, California," letter report from John S. Kim, Chief Engineer, QST Environmental, to Ms. Marina Robertson, GreenPark Ventures, 5 February 1999.

Two of the samples (S-1 and S-2) were taken in a “natural drainage channel flowing into the site from Rocketdyne,” chosen for their likelihood to catch contamination if any had migrated from Rocketdyne, the third (S-3) was taken from a wall of a natural canyon “not impacted by surface water run-off from Rocketdyne.” If Rocketdyne were the cause of any contamination, the levels found should be higher in the first two samples than in the third, according to the analysts. Samples were analyzed for strontium-90, cesium-137, and tritium, among the constituents of concern identified by EPA for the Rocketdyne site. QST compared its sample results with the average local background for these radionuclides identified by EPA in 1995.³ This is appropriate, because one wants to see if Rocketdyne activities have *added* contamination to the local environment, over and above local fallout.

The study concluded, “The analytical results of the soils samples ... indicated the *presence of Strontium in all samples collected* from S-1 and S-2 (ranging from 0.25 to 0.86) *that exceeded the EPA average local background concentration of 0.052...*” (emphasis added). The study noted also that all of the surface samples at S-1 and S-2 also exceeded the S-3 sample (0.41 pCi/g) taken as a kind of on-site background measurement (i.e., expected to be lower than S-1 and S-2 if there were Rocketdyne contamination at Runkle). Indeed, the “on-site background” value exceeds the off-site local background value by roughly an order of magnitude, and the surface measurements from samples S-1 and S-2 were roughly twice S-3, i.e., 0.86 and 0.83 pCi/g. All of these measurements are consistent with strontium-90 contamination from Rocketdyne affecting Runkle Ranch.

Cesium-137 was detected in one sample at levels that “exceeded the EPA average local background concentration of 0.087 pCi/g.” Tritium results were dismissed “due to laboratory ... error in conducting the analysis.”

The QST report concluded: “*Based on the analytical results of the soil samples, it would appear that there may have been some impact of radionuclides to the site from the Rocketdyne facility.* Consequently, a more extensive site investigation appears to be necessary to determine the lateral and vertical impact of radionuclides in the soil.” (emphasis added)

The 1999 Foster Wheeler Sampling⁴

Pursuant to the QST recommendation of a more extensive site investigation to determine the impact of radionuclides from Rocketdyne on Runkle Ranch soil, GreenPark contracted with Foster Wheeler Environmental Corporation to conduct additional samples on the 550-acre parcel slated for development. The results were dramatic.

³ QST refers to these values as “EPA local background,” but technically the background values were established by a Rocketdyne contractor, McLaren-Hart, as part of measurements of potential contamination at the Brandeis-Bardin Institute and the Santa Monica Mountains Conservancy (Sage Ranch) conducted in the early- to mid-1990s under EPA oversight.

⁴ “Final Report: Runkle Ranch Site Investigation, Simi Valley, CA,” Prepared for GreenPark Holdings, LLC, by Foster Wheeler Environmental Corporation, October 1999

58 soil samples were taken from grid locations across the property⁵. *Every single sample exceeded the EPA local background figure of 0.052 pCi/g for strontium-90.* I have plotted the measurements against the EPA local background value in Figure 1.

The mean (average) value for the 58 soil samples was 1.4 pCi/g, twenty-seven times local background. The highest measurement was 12.34 pCi/g, two hundred and thirty-seven times local background. Intriguingly, the location of that highest value was closest to Rocketdyne of all the 58 samples.

Indeed, when comparing the Sr-90 readings against the site plot plan, the analysts detected two correlations. The north end of the site (farthest from Rocketdyne) was an “area with consistently lower concentrations.” Secondly, the lower central part of the site had “slightly higher average concentrations.” [The GreenPark consultants attributed “no significance” to the variation.]

The EPA presumptive cleanup level – the Preliminary Remediation Goal (PRG) – for strontium-90 for suburban residential use is 0.231 pCi/gram.⁶ **ALL BUT ONE OF THE 58 SAMPLES EXCEEDED THE EPA PRG.** I have plotted the measurements against the EPA PRG in Figure II.

Cesium-137 was also elevated, but less so than strontium-90. 33 of 58 samples exceeded local background, but the mean value was 0.1 as opposed to the local background of .087. However, the minimum detection level frequently was greater than background. Furthermore, the protocols for handling the samples involved heating the samples, which could selectively drive off cesium, which has a lower volatilization temperature.

Subsequent tests were also performed by GreenPark, again finding elevated strontium-90.

CONCLUSION

The City of Simi approved the proposed housing development at Runkle Ranch, near SSFL, based in part on a conclusion in its Environmental Impact Report that stated, “Tritium and strontium-90 were not detected in *any* of the soil and groundwater samples at levels above normal background levels or at levels considered to pose a health risk.” (emphasis added) However, an analysis of the actual data – data which we understand

⁵ 58 samples are reported, numbered GP-01-M through GP-59-M. For some reason, GP-57-M is missing from the data tables in the Foster Wheeler Report. In our graphs that follow, we simply number the samples consecutively.

⁶ The EPA PRG table gives two values for strontium-90, one with daughter products and one without. For any contamination which is likely to have been in place for awhile, as is the case with the half-century of operations of SSFL, EPA assumes daughter products have reached “secular equilibrium” and one should use the strontium-90 + daughter product PRG of 0.231 pCi/g, as is done here. The PRG for strontium-90 without daughter products for suburban residential use is 0.331 pCi/g.

were not provided to the City during the EIR process – demonstrates that both statements appear to be incorrect. *All* of the 58 measurements referred to in the EIR section in question exceed EPA local background, and all but one of the measurements exceeded EPA’s Preliminary Remediation Goals.

The contamination clearly appears to have come from the nearby SSFL facility (there are no other known sources of anthropogenic radioactivity in the area and the measurements exceed background radioactivity levels from fallout). The mechanism of transport of the contamination is unresolved at present, although airborne deposition is one possibility.

Of the four offsite locations independently monitored for radioactivity – Brandeis Bardin Camp Institute, Sage Ranch, Dayton Canyon, and Runkle Ranch – all four have tested positive for elevated radioactivity (i.e., contamination above levels in background). This raises serious questions about contamination of other areas not tested.

It is recommended that a comprehensive, independent, well-design monitoring program for other offsite areas be considered, and the implications of offsite contamination be taken into account as onsite cleanup decisions are made.

Strontium-90

Runkle Ranch Sampling Results vs. EPA Local Background Level

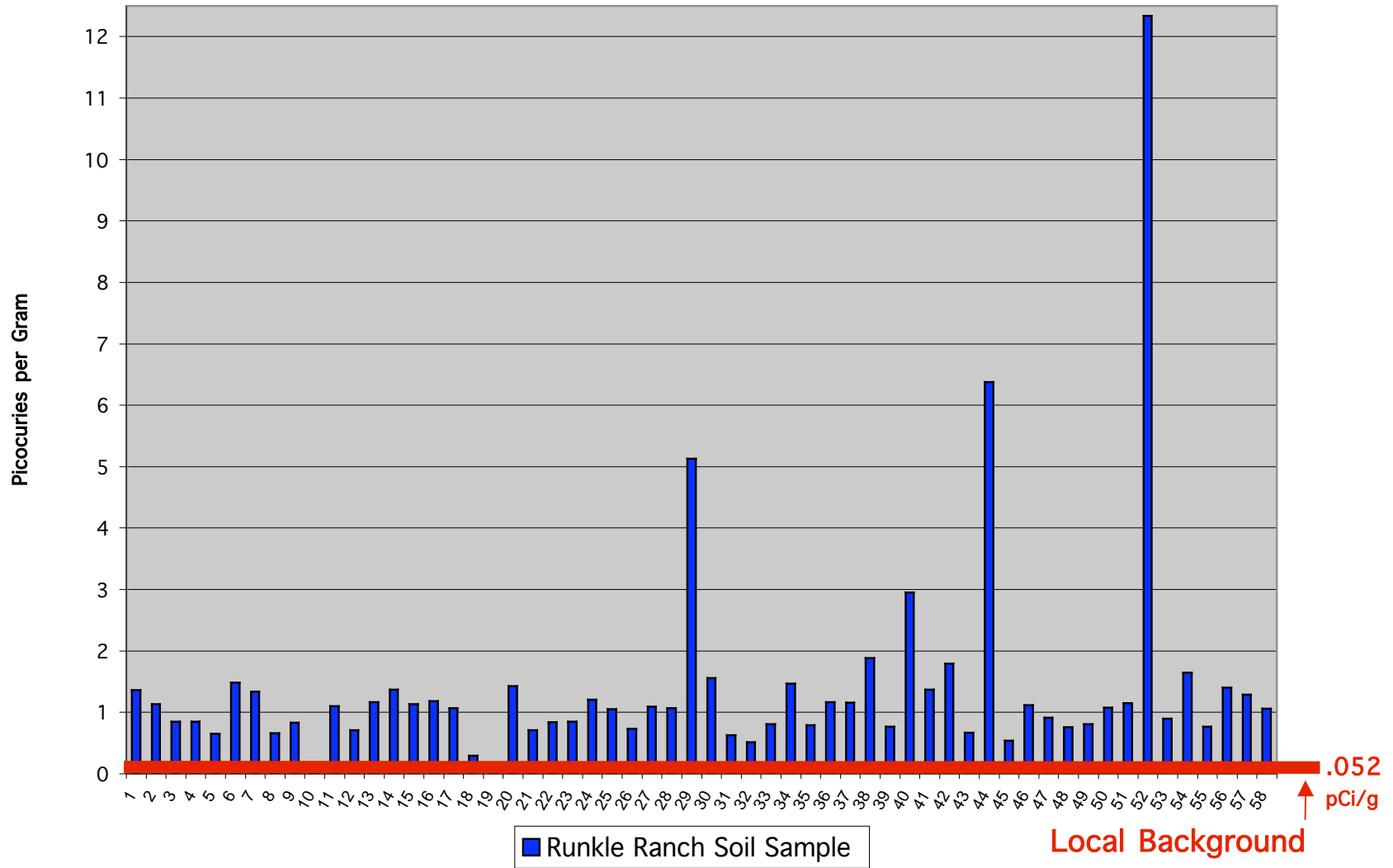


Figure I

Strontium-90

Runkle Ranch Sampling Results vs. EPA PRG (Preliminary Remediation Goal)

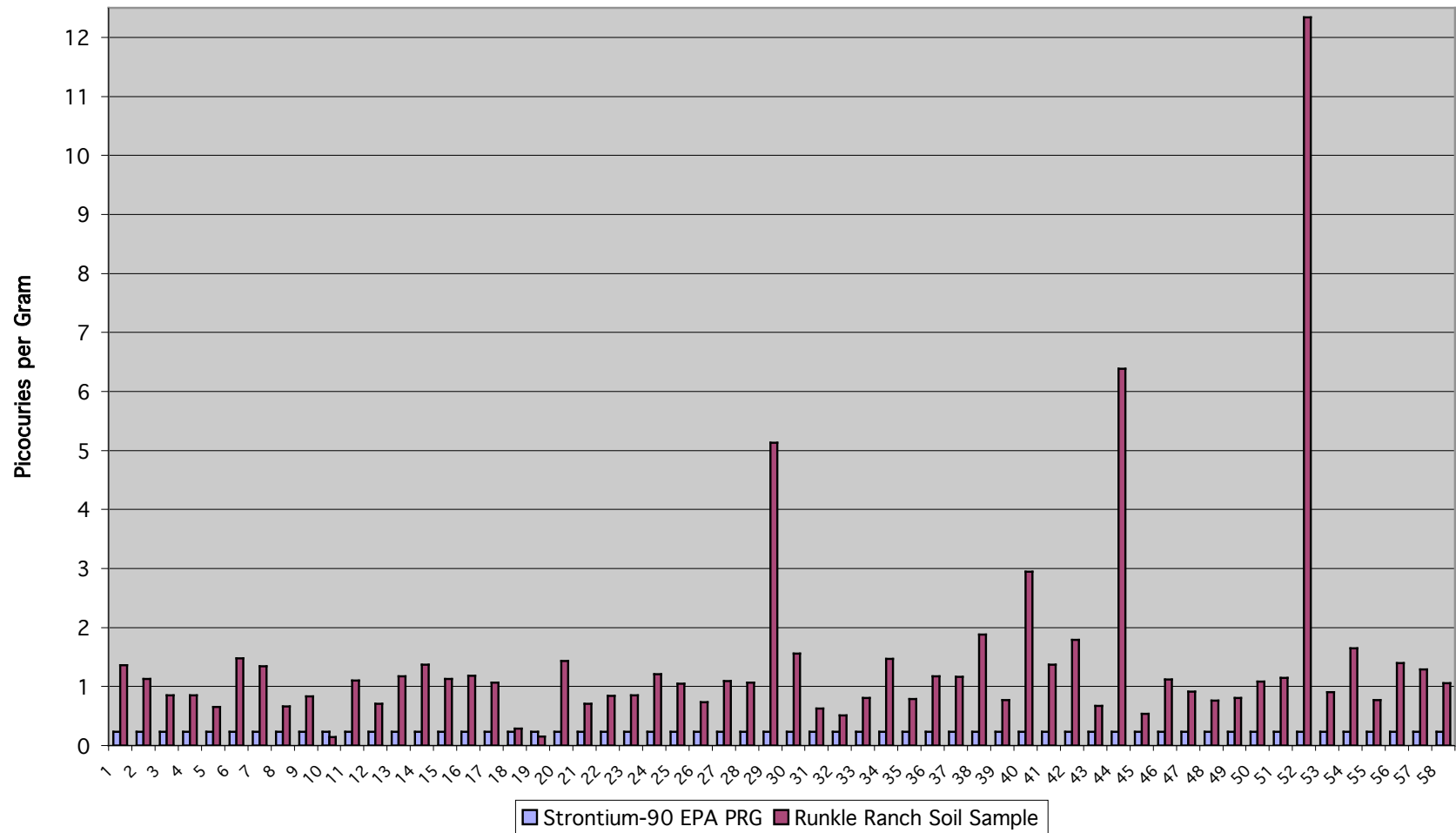


Figure II