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Ms. Yolande Norman
Materials Decommissioning Branch
Division of Waste Management and Environmental Protection
Office of Nuclear Materials Safety and Safeguard
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Dear Ms. Norman:

This letter, sent on behalf of the U.S. Army (Mr. Paul Cloud), Jefferson Proving Ground (JPG), responds to a question raised by the U.S. Nuclear Regulatory Commission (NRC) during the 22 September 2009 teleconference. The teleconference included NRC Technical Staff, the Army's Radiation Safety Officer (RSO, Paul Cloud), and four technical staff from Science Applications International Corporation (SAIC). Specifically, this letter addresses a question concerning the spatial distribution of proposed sampling locations where soil was collected to conduct partition coefficient (K_d) testing. Table 1 lists all of the proposed samples, soil type groupings, types of sorption tests, site I.D.s/depths, and concentrations. The site I.D.s are the names assigned to the locations where the samples were collected and are shown in Figures 1 and 2.

Figure 1 shows the locations where depleted uranium (DU) penetrators were collected in October 2008. Eighteen samples (identified with ten black squares in Figure 1) signify the locations where soil also was collected to assess desorption of uranium from soil using partition coefficient (K_d) testing. The spatial distribution of proposed locations spans the widest area available from north to south and east to west where penetrators were collected in October 2008. It should be noted that penetrators are not distributed throughout the entire 2,080-acre DU Impact Area. Instead, they are primarily located in close proximity to firing lines running south to north between C Road and Big Creek as shown in red in Figure 1. Most penetrators are located near the trench formed by the middle firing line, which is associated with the 500 Center Firing Position, since it was used to fire approximately 90 percent of the DU penetrators into the DU Impact Area. Due to the difficulty in locating DU penetrators and the explosives safety hazards present throughout the DU Impact Area, the focus of the search was limited to the areas where penetrators would most readily be found as described above. It should be noted that the criteria defined in Field Sampling Plan (FSP) Addendum 7 were to locate penetrators in all the soil type groupings and provide a broad range of concentrations. Since the recommended sample locations ranged in concentrations from approximately 15 to 29,000 pCi/g and samples were collected from each of the soil type groupings (8 from Avonsburg/Cobbsfork, 8 from Cincinnati/Rossmoyne, and 2 from Grayford/Ryker), this objective was met for the samples recommended for desorption testing.

Figure 2 shows the locations of where background soil samples were collected. Six samples (identified with five black squares in Figure 2) signify the locations where soil also was collected to assess adsorption of uranium to soil using partition coefficient (K_d) testing. The spatial distribution includes 4 proposed locations near Little Graham Creek and 2 proposed locations further east and south. Like the samples proposed for desorption testing, FSP Addendum 7 included objectives for these locations to include samples from each of the predominant soil type groups and with concentrations consistent with background. As these samples were collected from the 3 predominant soil type groupings (2 each from Avonsburg/Cobbsfork, Cincinnati/Rossmoyne, and Grayford/Ryker) and concentrations were all relatively low (approximately 1.4 to 1.9 pCi/g), this objective was met for the samples recommended for adsorption testing.

If you have any questions, please contact Mr. Paul Cloud, Jefferson Proving Ground (JPG) License Radiation Safety Officer, U.S. Army JPG at (410) 436-2381, E-mail address: paul.d.cloud@us.army.mil.

Sincerely,

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Table 1. Proposed Sample Listing for Adsorption and Desorption Testing

Soil Types	Sorption	Site ID / Depth BLS (feet)	Concentration (pCi/g)
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-003 / 0.5 to 1.0	2,691 ± 46.2
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-005 / 0.0 to 0.5	460 ± 64
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-005 / 0.5 to 1.0	295 ± 59
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-005 / 1.0 to 2.0	15.4 ± 13
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-005 / 2.0 to 4.0	51.7 ± 8.2
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-006 / 0.15 to 0.5	29,1117 ± 141
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-007 / 1.0 to 2.0	160 ± 9.91
Avonsburg/ Cobbsfork	Desorption	JP-PNAC-007 / 0.35 to 0.5	12,106 ± 129
Avonsburg/ Cobbsfork	Adsorption	JP-SAC-001 / 0.0 to 0.5	1.59 ± 0.362
Avonsburg/ Cobbsfork	Adsorption	JP-SAC-001 / 2.0 to 4.0	1.53 ± 0.343
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-001 / 1.0 to 2.0	836 ± 25
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-002 / 0.0 to 0.5	6,437 ± 68
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-005 / 0.5 to 1.0	591 ± 23
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-005 / 1.0 to 2.0	129 ± 17.5
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-006 /0.625 to 1.125	1,843 ± 36.7
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-008 / 0.0 to 0.25	12,396 ± 97
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-008 / 0.25 to 0.75	5,094 ± 59
Cincinnati/ Rossmoyne	Desorption	JP-PNCR-008 / 0.75 to 1.25	531 ± 22
Cincinnati/ Rossmoyne	Adsorption	JP-SCR-004 / 0.0 to 0.5	1.55 ± 0.350
Cincinnati/ Rossmoyne	Adsorption	JP-SCR-005 / 2.0 to 4.0	1.83 ± 0.412
Grayford/ Ryker	Desorption	JP-PNGR-001 / 0.0 to 0.5	4,181 ± 73
Grayford/ Ryker	Desorption	JP-PNGR-001 / 1.0 to 2.0	71.6 ± 10
Grayford/ Ryker	Adsorption	JP-SGR-007 / 2.0 to 4.0	1.93 ± 0.429
Grayford/ Ryker	Adsorption	JP-SGR-008 / 0.0 to 0.5	1.39 ± 0.314

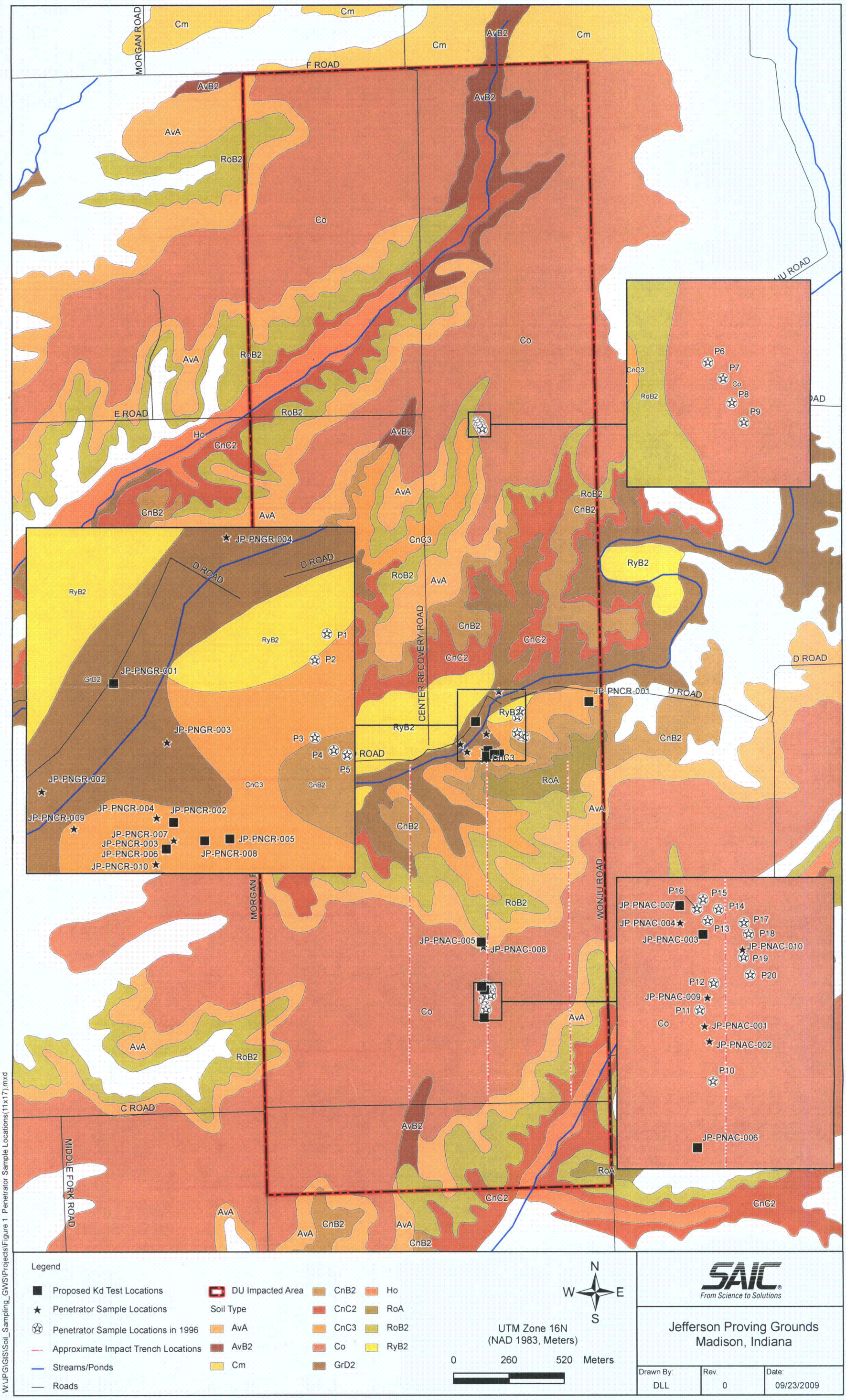

Figure 1. Penetrator Sample Locations

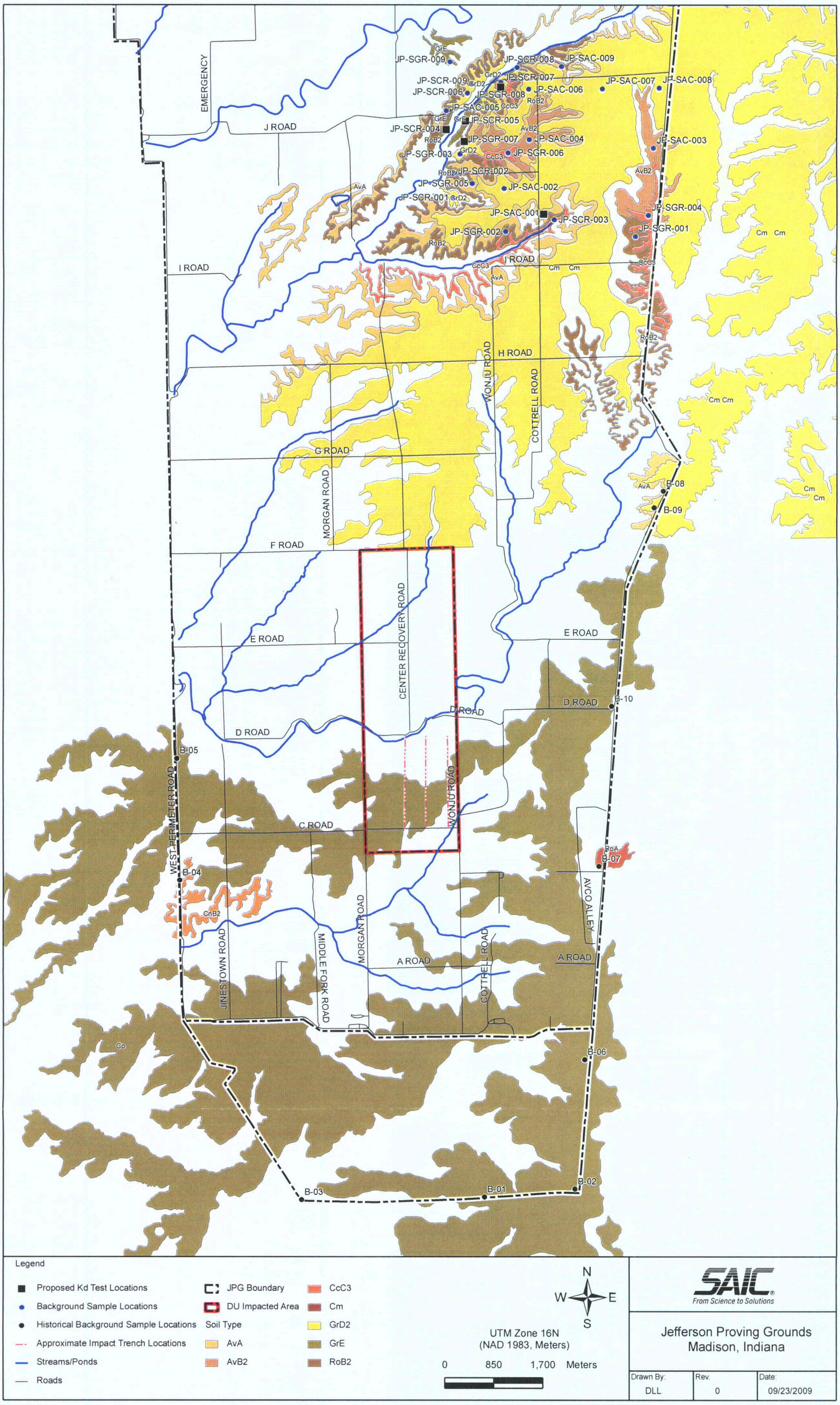

Figure 2. Background Sample Locations