



Environmental Education and Technology Development on page iv in the WERC 2003 Final Report as follows:

[t]he Panel was concerned that the [excavation] alternatives did not account for other contaminants of concern, even though volatile organic compounds (VOCs) were detected at low levels in the soil beneath the MWL. Again, the uncertainty regarding the type and quantity of the wastes placed in combination with a detectable level of VOCs would suggest that this finding cannot be ignored. The Panel was specifically concerned with the fact that inventory information was limited (or not available at all) for the years after the MWL opened and before the Chemical Waste Landfill opened (i.e., 1958 to 1962). These concerns led to the discussion of a soil vapor extraction alternative as part of a long-term monitoring strategy that would offer SNL several advantages. First, the system could be utilized in combination with many of the lower-cost cover scenarios. Second, installation of the system would allow for regular, periodic sampling of the vadose zone beneath the MWL. The system would be in place and operational and, therefore, could be employed with a substantially quicker response time (as compared to groundwater monitoring) in an emergency situation should a subsurface release occur or be detected.

From page 21 of the WERC 2003 Final Report:

MWL inventory data for the period 1958-1964 were destroyed as part of normal record keeping protocol. This is particularly disconcerting information because the site operational history (Section 1.0 of the Draft Corrective Measures Study) does not indicate this situation for the MWL inventory data and does not report that in the early years of operation the MWL was probably used as the chemical dump prior to the opening of the Chemical Waste Landfill.

Anecdotal testimony exists that refers to deposition of non-stabilized free liquids (possibly solvents) in addition to the 204,000 gallons of cooling water discharged in Trench D during 1967.

Amount of hazardous waste is not well understood – the inventory does not match the characterization of Pit 35, Trenches B and C. For instance, the inventory provides no plausible explanation for the levels of solvents (TCE, PCE, TCA, CFCs) found by the *Phase 2 RCRA Facility Investigation*.

#### Uncertain Nature and Extent of Groundwater Contamination

The RCRA Phase 1 and Phase 2 Facility Investigations determined that there was a large release of hazardous wastes to the vadose zone and to the groundwater below the SNL MWL dump. The nature and extent of groundwater contamination is not known because up to the present time the only two monitoring wells at appropriate locations and depths to detect groundwater contamination at the water table from the MWL dump were wells MWL-MW1 and -MW3 (see Figure 2 for the locations of the monitoring wells). The two wells were

plugged and abandoned in 2008 and not replaced with new reliable monitoring wells to investigate the nature and extent of the groundwater contamination.

The first water samples were collected from wells MW1 and MW3 in the early 1990's. The analytical data for water samples collected from the two wells showed statistically significant evidence of groundwater contamination for several RCRA hazardous waste constituents using the RCRA criteria described in 40 CFR §§ 264.97 and 264.98. The comparison of water quality data from wells MW1 and MW3 to the water quality data from wells MW2 and BW1 at locations distant from the MWL dump showed that the wastes disposed of in the dump contaminated the groundwater with cadmium, chromium, nitrates and especially nickel.

Table 1 lists the high nickel concentrations measured in groundwater samples collected from the two wells MW1 and MW3 (and especially from well MW1) compared to the markedly lower nickel concentrations in the groundwater samples collected from wells MW2 and BW1. The four wells were installed at nearly the same time with stainless steel screens. There is no scientific basis to the claim by SNL that the only source for the high concentrations of nickel in the groundwater samples collected from wells MW1 and MW3 was corrosion of the stainless steel well screens. The nature and extent of the nickel contamination and other contamination in the groundwater at the location of well MWL-MW1 on the north side of the MWL dump (see Figure 2) is not known because the well was plugged and abandoned in 2007 without installation of a new monitoring well.

#### Contamination measured in deep soil samples

The hazardous wastes detected in core samples collected from boreholes drilled at the SNL MWL dump were summarized in the NMED 1998 NOD for the Phase 2 RFI Report to include cadmium, cobalt, copper, nickel, silver, and zinc. The 1998 NMED NOD made the following statement:

The presence of metal contaminants at depths which can exceed 100 ft indicate that liquid wastes were disposed of in the landfill. Thus, groundwater monitoring for metals is required.

Nevertheless, reliable monitoring wells for groundwater monitoring for metals were not installed at the SNL MWL dump at any time from the first wells in the early 1990s to the existing wells installed in 2008 for the proposed LTMMP.

#### SNL Fate and Transport Studies show the groundwater is contaminated

The SNL MWL 2007 Fate and Transport Model Report (Ho et al. 2007) on page 14 described the inventory of wastes in the MWL dump to include 61,380 pounds of uranium as uranium-238 (depleted uranium) and 281,600 pounds of lead. Ho et al. (2007) on page 14 identified uranium as a potential contaminant to groundwater.

Ho et al. (2007) described the cadmium detected in the groundwater samples collected from the SNL MWL dump monitoring wells as follows:

Cadmium has occasionally been detected in MWL groundwater at concentrations above the EPA MCL, although these detections are sporadic and unpredictable. Because the cadmium detections above the MCL are inconsistent, it is believed that these detections do not indicate contamination from the MWL. Nevertheless, cadmium is considered a contaminant of concern, and the fate and transport of cadmium was modeled.

Unfortunately, Ho et al. (2007) did not recognize the overall failure of the monitoring wells at the MWL dump to be able to provide reliable and representative groundwater samples for the nature and extent of groundwater contamination from the cadmium wastes or from any of the radioactive, mixed and hazardous wastes disposed of at the dump.

Ho et al. (2007) and an earlier SNL fate and transport report (Klavetter, 1995) found that the solvent wastes disposed of at the SNL MWL dump may contaminate the groundwater below the dump. From page 53 in Ho et al. (2007):

Volatile organic compounds (VOCs) were used as cleaners and solvents for machining and other industrial processes at Sandia National Laboratories. Rags, residual containers, and other wastes contaminated with these contaminants were disposed of at the MWL. Although no quantitative estimates of the volumes of these contaminants disposed of in the MWL exists, soil samples provide an estimate of the extent and concentration of the region contaminated with VOCs at the MWL. Previous studies have shown that VOCs such as trichloroethylene (TCE) and tetrachloroethylene (PCE) can migrate long distances in the vapor phase. Klavetter (1995a) showed that among the VOCs of concern at the MWL, PCE was the only VOC that posed a threat to exceeding regulatory metrics in the groundwater [Emphasis supplied].

Ho et al. (2007) on page 55 also found that groundwater below the MWL dump was contaminated with PCE as follows:

The majority of the realizations show the aquifer concentrations [for PCE] peaking before 50 years. Depending on the time of disposal, this corresponds to peak concentrations occurring by 2010 – 2040. So far, no detectable amounts of PCE have been found in the groundwater at the MWL.

As described earlier, Ho et al. (2007) apparently did not recognize that the monitoring wells installed at the MWL dump were not reliable for the detection of groundwater contaminated with PCE and the other VOCs detected in the vadose zone below the dump. Nevertheless peak concentrations of PCE were modeled to occur now and for the next 30 years.

The discussion on the above pages documents the disposal of hazardous wastes into the SNL MWL dump, the release of many hazardous constituents to the vadose zone below the dump and the detection of cadmium, chromium, nitrates and nickel in groundwater samples collected from the network of defective monitoring wells. Indeed, expert reports in the early

1990s to 1998 by EPA Region 6, the NMED Hazardous Waste Bureau, the DOE Tiger Team and the DOE Oversight Bureau described the overall failure of the monitoring wells presented in SNL reports up to the unreliable compliance network in the SNL proposed LTMMMP (see the discussion of the expert reports in Topic 11 in the comments provided to the NMED on November 9, 2012).

#### Mistake in Designating SNL MWL Dump as a Solid Waste Management Unit

A very serious issue is the mistake by EPA Region 6 and the NMED to designate the SNL MWL dump as a solid waste management unit (SWMU). The Resource Conservation and Recovery Act (RCRA) designates disposal sites that received hazardous waste after July 26, 1982 as "regulated units." From 40 CFR § 264.90(2):

"All solid waste management units must comply with the [corrective action] requirements in §264.101. A surface impoundment, waste pile, and land treatment unit or landfill that receives hazardous waste after July 26, 1982 (hereinafter referred to as a "regulated unit") must comply with the requirements of §§264.91 through 264.100 in lieu of §264.101 for purposes of detecting, characterizing and responding to releases to the uppermost aquifer. The financial responsibility requirements of §264.101 apply to regulated units."

From 40 CFR § 270.1 Purpose and scope of these regulations:

(c) *Scope of the RCRA permit requirement.* RCRA requires a permit for the "treatment," "storage," and "disposal" of any "hazardous waste" as identified or listed in 40 CFR part 261. The terms "treatment," "storage," "disposal," and "hazardous waste" are defined in §270.2. Owners and operators of hazardous waste management units must have permits during the active life (including the closure period) of the unit. Owners and operators of surface impoundments, landfills, land treatment units, and waste pile units that received waste after July 26, 1982, or that certified closure (according to §265.115 of this chapter) after January 26, 1983, must have post-closure permits, unless they demonstrate closure by removal or decontamination as provided under §270.1(c)(5) and (6), or obtain an enforceable document in lieu of a post-closure permit, as provided under paragraph (c)(7) of this section. If a post-closure permit is required, the permit must address applicable 40 CFR part 264 groundwater monitoring, unsaturated zone monitoring, corrective action, and post-closure care requirements of this chapter. The denial of a permit for the active life of a hazardous waste management facility or unit does not affect the requirement to obtain a post-closure permit under this section [Emphasis supplied].

#### Loss of interim status under RCRA

RCRA required SNL to obtain an operating permit to dispose of hazardous waste at the SNL MWL dump. Recognizing that it would take EPA many years to issue operating permits to all RCRA facilities, Congress created "interim status" under Section 3005(e) of the Act. Interim status allowed the SNL MWL dump to operate under Subtitle C of RCRA until their permits are issued or denied. However, there was a loss of interim status for

the SNL MWL dump because (1) SNL did not apply for the required operating permit and (2) SNL did not install the required network of reliable monitoring wells.

SNL did not apply for Part A and Part B permit applications to obtain the required RCRA Operating Permit to dispose of hazardous wastes at the Sandia MWL dump at any time. The failure to submit the permit applications on the required schedule caused loss of interim status and a requirement under RCRA to stop the disposal of hazardous wastes at the dump by not later than May 19, 1981 as follows in 40 CFR Section 270.73 Termination of Interim Status:

**§ 270.73 Termination of interim status.**

§ 270.73 (d) For owners or operators of each land disposal facility which is in existence on the effective date of statutory or regulatory amendments under the Act that render the facility subject to the requirement to have a RCRA permit (e.g. May 19, 1980 in 40 CFR Subpart 265), and which is granted interim status, [interim status terminates] twelve months after the date on which the facility first becomes subject to such permit requirement unless the owner or operator of such facility:

- (1) Submits a part B application for a RCRA permit for such facility before the date 12 months after the date on which the facility first becomes subject to such permit requirement (submit the part B application by May 19, 1981); and
- (2) Certifies that such facility is in compliance with all applicable ground water monitoring and financial responsibility requirements.

The termination of interim status on May 19, 1981 required SNL to submit a closure plan to EPA Region 6 (the applicable regulatory authority) within 15 days of termination of interim status [40 CFR 265.112 (d)(3)(i)]. Closure of the SNL MWL dump was required within 90 days of closure plan approval unless a longer time period was approved by the applicable regulatory authority [40 CFR 265.113(a)]. However, SNL did not submit the permit applications or the required closure plan. Instead, SNL continued to illegally dispose of hazardous waste and mixed waste in the SNL MWL dump for a period greater than 17 years until December 1998.

**Loss of interim status under RCRA for disposal of mixed waste**

Mixed waste is radioactive waste that contains a component of hazardous waste. In 1986, EPA clarified that the hazardous component of mixed waste was subject to RCRA regulation, and that States with authorized RCRA programs may apply to EPA for authorization to regulate the hazardous component of mixed waste. New Mexico received authority to manage mixed waste effective July 25, 1990. 55 Fed. Reg. 28,397 (July 11, 1990). Accordingly, SNL was required to submit a Part B application for the SNL MWL dump by July 11, 1991 but did not. In addition, SNL has not provided the required closure plan and post-closure permit in the Draft SNL RCRA Permit.

## SNL MWL Dump was not closed as required by RCRA

A very serious mistake by NMED attorney Tanis Fox is the statement on February 15, 2008 to the Supreme Court for the State of New Mexico that the SNL MWL was closed in 1988 and therefore was not required to apply for a permit to operate as a disposal facility with the designation by RCRA as a "regulated unit" because of the disposal of mixed waste. The incorrect statement is on page 4 in Sup. Ct. No. 30,844 (Ct. App. No. 25,896) as follows:

On August 6, 1992, NMED issued hazardous waste permit number NM5890110518 ("SNL Permit" or "Permit") to SNL for the storage of hazardous waste; the Permit was comprised of Modules I, II, and III. AR 001083,001084, 001394. The Permit did not include the SNL MWL as a permitted unit because the MWL had closed in 1988. Because the MWL was closed and no longer operating, and because NMED did not receive authority to manage mixed waste until after the MWL was closed, the MWL was not included in SNL's Part B permit application to be permitted as an operating unit or in SNL's Part A permit application to be allowed to operate on interim status. AR 001156

The SNL MWL dump was not closed under RCRA requirements at any time up to the present. The SNL MWL dump (a RCRA regulated unit) stopped all disposal operations including disposal of mixed waste in December 1988. However, the MWL dump did not go through the closure process as required by RCRA for regulated units. Instead, the unacceptable scheme in the SNL proposed LTMMP is to close the MWL dump with the corrective action process in 40 CFR § 264.101. However, as stated above on page 5, 40 CFR § 264.90(2) requires regulated units to comply with the requirements of §§264.91 through 264.100 in lieu of §264.101 for purposes of detecting, characterizing and responding to releases to the uppermost aquifer.

### SNL MWL Dump is an Isolated RCRA "Regulated Unit"

**Federal Register / Vol. 63, No. 204 / Thursday, October 22, 1998 / Rules and Regulations pages 56710 to 56735 presents the Final Rule titled "Standards Applicable to Owners and Operators of Closed and Closing Hazardous Waste Management Facilities; Post-Closure Permit Requirement; Closure Process (Final Rule 56710).**

The Final Rule 56710 describes that the RCRA Corrective Action process in 40 CFR §264.101 may be used for closure of regulated units where a release has occurred and one or more SWMUs are located close to the regulated unit. However, the SNL MWL dump regulated unit is an isolated disposal facility and corrective action may not be used for closure. From page 56727 in Final Rule 56710:

This rule retains the closure requirements for isolated units. This final rule allows the Regional Administrator to replace the requirements of [40 CFR 264] Subparts F, G, and H with alternative requirements developed for corrective action only where a regulated unit is situated among SWMUs (or areas of concern), a release has occurred, and both the regulated unit and one or more SWMUs (or areas of concern) are likely to have contributed to the release [Emphasis supplied].

Improper Use of the SNL proposed Long Term Monitoring and Maintenance Plan in Lieu of  
a  
Closure and Post-Closure Permit

In summary, Final Rule 56710 does not allow the use of corrective action as implemented in the SNL proposed LTMMP in lieu of a closure plan and post-closure permit in the SNL Permit. However, the public comment period for the Draft SNL Permit began on September 17, 2012 and ends at 5:00 p.m. MST on November 16, 2012. A very serious mistake is that the Draft SNL Permit does not recognize the SNL MWL dump as a regulated unit with the requirement for closure plan and post-closure permit. Instead, the Draft SNL Permit incorrectly describes the regulated unit as SWMU 76. The NMED is required by RCRA regulations to retract the Draft SNL Permit and correct the serious omission that the SNL MWL dump is a RCRA regulated unit.

Indeed, as cited above on page 5, Final Rule 56710 promulgated § 270.1 – Purpose and scope of these regulations with pertinent excerpts as follows:

§ 270.1 (c) *Scope of the RCRA permit requirement.* RCRA requires a permit for the “treatment,” “storage,” and “disposal” of any “hazardous waste” as identified or listed in 40 CFR part 261. . . Owners and operators of hazardous waste management units [i.e., the SNM MWL dump] must have permits during the active life (including the closure period) of the unit. Owners and operators of landfills that received waste after July 26, 1982, or that certified closure (according to § 265.115 of this chapter) after January 26, 1983, must have post-closure permits. . . [t]he permit must address applicable 40 CFR part 264 groundwater monitoring, unsaturated zone monitoring, corrective action, and post-closure care requirements of this chapter. The denial of a permit for the active life of a hazardous waste management facility or unit [i.e., the SNM MWL dump] does not affect the requirement to obtain a post-closure permit under this section [Emphasis supplied].

Sincerely,

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**Table 1.** Total and dissolved nickel measured in the water samples produced from the two contaminant detection monitoring wells MWL-MW1 and -MW-3 compared to the markedly lower concentrations measured in the two background monitoring wells MWL -BW1 and - MW2 at the Sandia Mixed Waste Landfill. The four wells have stainless steel screens.

	- Well MW1 Nickel (ug/L) <sup>A</sup>	- Well MW3 Nickel (ug/L)	- Well BW1 Nickel (ug/L)	- Well MW2 Nickel (ug/L)
- Date	T <sup>B</sup> / D <sup>C</sup>	T / D	T / D	T / D
- 09 - 90	46 / 43	ND <sup>D</sup> <40/ND< 40	ND<40/ND<40	ND<40/ND<40
- 01 - 91	NA <sup>E</sup> / NA	NA / NA	NA / NA	NA / NA
- 04 - 91	NA / NA	NA / NA	NA / NA	NA / NA
- 10 - 91	NA / NA	NA / NA	NA / NA	NA / NA
- 07 - 92	150 / 63	66 / 43	ND<40/ND<40	ND<40 / ND<40
- 01 - 93	78 / NA	26 (j) <sup>F</sup> / NA	ND < 40 / NA	ND < 40 / NA
- 04 - 93	97 / 94	37 (j) / 33 (j)	7.5 / 16	14 (j) / 13 (j)
- 11 - 93	95 / NA	ND < 40 / NA	ND < 40 / NA	ND < 40 / NA
- 05 - 94	110 / NA	ND <40 / NA	NA / NA	ND < 40 / NA
- 10 - 94	130 / NA	ND < 40 / NA	9.8 (j) / NA	ND < 40 / NA
- 04 - 95	120 / NA	NA / NA	9.3 (j) / NA	7.5 (j) / NA
- 10 - 95	107 / NA	7.99 (j) / NA	1.96 (j) / NA	NA / NA
- 04 - 96	145 / NA	3.67 (j) / NA	ND < 0.81 / NA	3.42 (j) / NA
- 04 - 97	NA / NA	NA / NA	NA / NA	NA / NA
- 10 - 97	NA / NA	NA / NA	NA / NA	NA / NA
- 04 - 98	398 / 538	36.2 / 28.5	2.9 (j) / NA	5 (j) / 4
- 11 - 98	490 / 467	18 / 18.3	7.19 / 9.47	4.49 / 3.42
- 04 - 99	266 / 313	31 / 31.3	12.8 / 14.3	5.31 / 4.37
- 04 - 00	279 / 281	25.1 / NA	16.5 / NA	124 / NA
- 04 - 01	252 / NA	14.1 / NA	191 / NA	88.2 / NA
- 04 - 02	265 / NA	96.1 / NA	13.6 / NA	89.7 / NA
- 04 - 03	374 / NA	NA / 69.4	26.6 / NA	52 / NA
- 04 - 04	401 / NA	56 / NA	33.2 / NA	10.5 / NA
- 04 - 05	424 / 405	17.3 / 11.5	35.5 / NA	10.5 / NA
- 04 - 06	477 / NA	157 / NA	NA / NA	6.76 / NA
- 04 - 07	436 / 284	84.8 / 120	NA / NA	7.34 / 5.41

<sup>A</sup> ug/L = micrograms per liter or parts per billion

<sup>B</sup> T = Concentration of total nickel measured in an unfiltered water sample

<sup>C</sup> D = Concentration of dissolved nickel measured in a filtered water sample

<sup>D</sup> ND = nickel was not detected at the listed minimum detection level

<sup>E</sup> NA = nickel was not analyzed in samples collected on this date

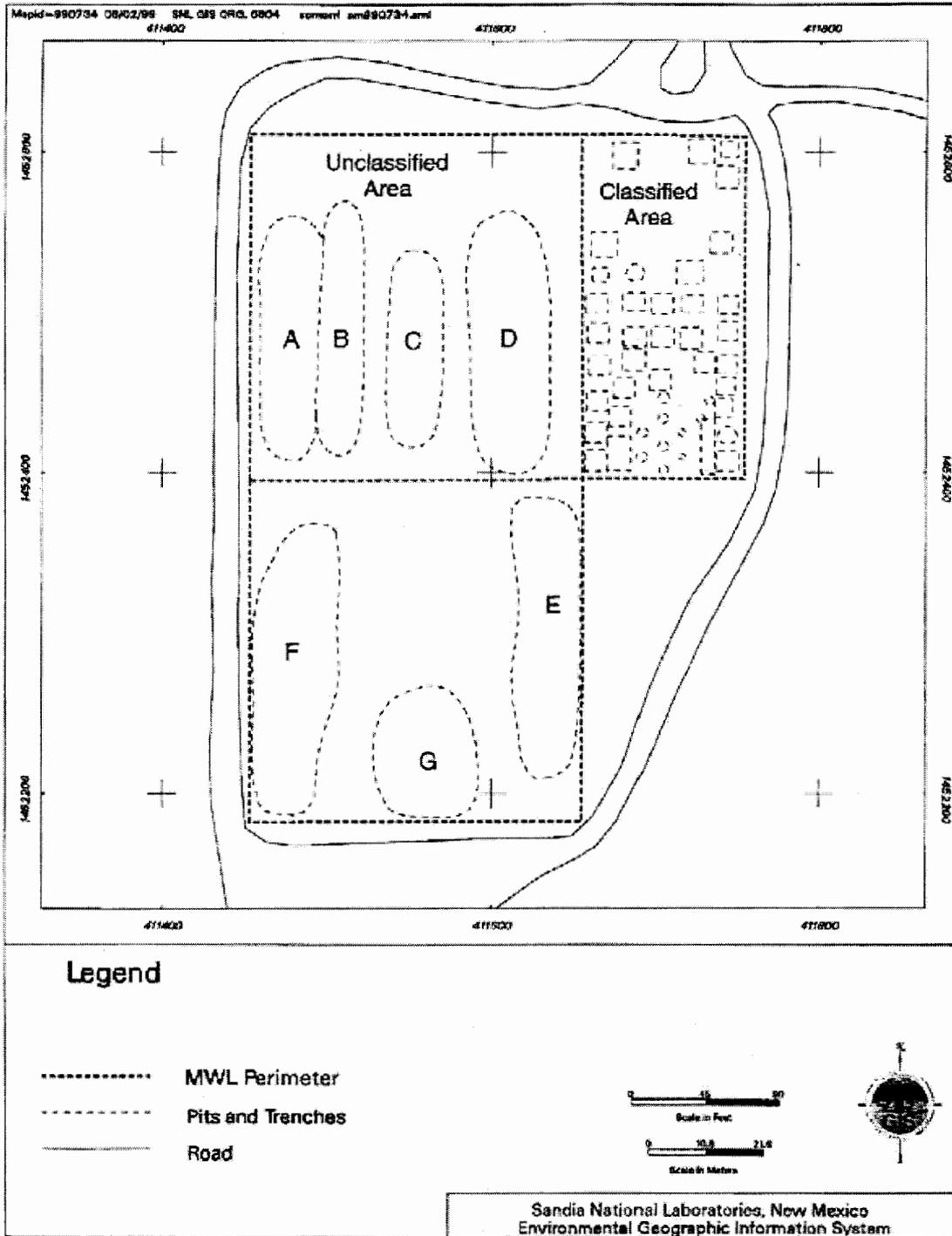
<sup>F</sup> (j) = the listed value is an estimated value

- The NMED proposed trigger for total and dissolved nickel in groundwater is 50 ug/L.

- The locations of the monitoring wells are displayed on Figure 2.

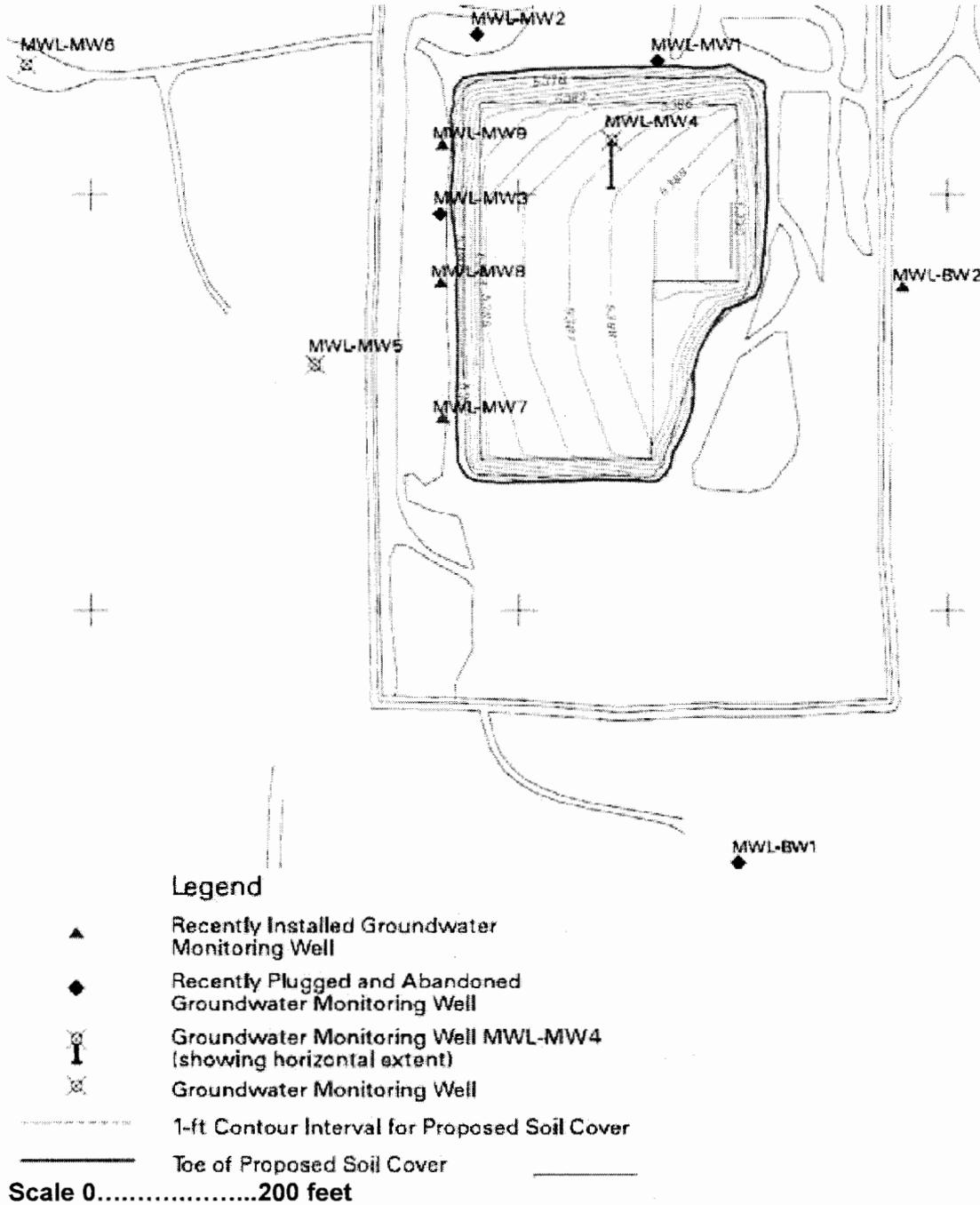
- **Please note:** The dissolved nickel concentrations in wells MW2 and BW1 at locations away from the SNL MWL dump are only rarely greater than 10 ug/L compared to the record of increasing dissolved nickel concentrations in well MW1 with concentration ranging from 281 to 538 ug/L for groundwater samples collected in 1998 to 2007. The dissolved nickel concentrations at well MW3 also increase over time with the highest concentration at 120 ug/L measured in the last water sample collected in 2007 before the well was plugged and abandoned. **An average dissolved nickel concentration of 1.2 ug/L was measured in water samples collected on six dates in 2008 and 2009 from the new background water quality monitoring well MWL-BW2 with a range from 0.82 to 1.7 ug/L.**

Figure 1. Map of the 2.6 acre Sandia Mixed Waste Landfill (Sandia MWL dump) showing the locations of the 45 unlined disposal pits in the 0.6-acre Classified Area and the 7 unlined disposal trenches in the 2-acre Unclassified Area.



Source: Figure 1-3 in Sandia Report SAND 2002-4098 (Goering et al., 2002).

Figure 2. Location of the new unreliable detection monitoring wells MWL-MW7, -MW8 and -MW9 along the western boundary of the Sandia MWL Dump and the new background monitoring well MWL-BW2 200 feet east of the MWL Dump. The figure also shows the location of the plugged and abandoned monitoring wells MWL-MW1, -MW2, -MW3, and -BW1.



Source: Figure 1-2 in Mixed Waste Landfill Groundwater Monitoring Report Calendar Year 2008, Sandia National Laboratories, May 27, 2009