

**HEALTH CONSULTATION**

**Southern Ocean Landfill**

**Waretown (Ocean Township), Ocean County, New Jersey**

**CERCLIS NO.: NJD084045061**

**February 6, 1996**

**Prepared by:**

**New Jersey Department of Health  
Environmental Health Services**

**Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry**

## **BACKGROUND AND STATEMENT OF ISSUES**

### **Background**

The Southern Ocean Landfill (SOLF) [39° 47' 43" North, 74° 18' 43" West] is a privately-owned, unlined landfill which operated from approximately 1971 through October 1988. The SOLF, located at the intersection of County Routes 532 (Wells Mills Road) and 611 (Brookville Road) approximately 3.4 miles west of the Garden State Parkway in Ocean Township in southern Ocean County, encompasses approximately 58 acres of several lots which total 283 acres (see Figure 1). The southern property line parallels Route 532 (Wells Mills Road) for a distance of approximately 1100 feet; the irregularly shaped landfill extends approximately 7000 feet northwest from Route 532. Directly east of the landfill is an existing gravel borrow area owned and used by Ocean Township for municipal vehicle storage and maintenance. The land area surrounding the landfill on the north side of Route 532 is predominantly undeveloped and forested. The SOLF site is situated in the Pinelands area, and is adjacent to the Greenwood Forest Wildlife Management Area; these areas of pine forest have been set aside to conserve wildlife and protect the underlying aquifer.

SOLF had been permitted to operate as a sanitary landfill for municipal solid waste (including bulk agricultural and vegetative waste), liquid septage, and sewage sludge, and was licensed under the New Jersey Pollutant Discharge Elimination System (NJPDES) to discharge leachate to the ground waters of the State. However, there is record of several hazardous materials being dumped in 1976, 1977, and 1980 (liquid chemical wastes), 1981 (aerosol cans), and 1983, 1985 and 1986 (asbestos). A Notice of Violation was issued by the New Jersey Department of Environmental Protection (NJDEP) in 1979 due to sewage sludge breaching the dike and flowing beyond the boundaries of the landfill. A preliminary Site Inspection Review (by file) was conducted by NJDEP in 1985. In 1987 an Administrative Consent Order was issued by NJDEP for failure to comply with sanitary landfill permit requirements under the Solid Waste Management Act, primarily citing improper coverage of wastes. In 1988 the Pinelands Commission claimed violations by the landfill of the Pinelands Comprehensive Management Plan, alleging that, among others, the landfill had accepted solid waste from areas outside the Pinelands. In 1988 the landfill was also cited for violations related to efforts to modify the operation of and to expand the active area of the landfill. As a result, when the NJPDES permit expired in October 1988, SOLF was ordered to be closed since, according to tipping records, it had reached the capacity established by the permit. The landfill has been inactive since that time, with only periodic monitoring of ground water and leachate being conducted. A site inspection with environmental sampling was conducted in 1989 by NUS Corporation, under contract with USEPA.

### *Site Visit*

Representatives of NJDOH (B. Wilcomb, J. Pasqualo) and ATSDR (S. Jones) conducted a site visit on December 15, 1994. The site was observed to be inactive, with only maintenance

personnel present. The Southern Ocean Landfill property is completely surrounded by an 8-foot chain link fence; there was no evidence of trespass of the site. No discernable odors were present at the site, and there was no visual indication of chemical contamination. The SOLF site presented no obvious physical hazards, and there was no indication of radiological or biological hazard. Level D personal protection is adequate for entry to the site.

The closest habitation is approximately 0.7 miles south of SOLF along Route 611 (Brookville Road), where a Boy Scout/Girl Scout Camp and several residences are located. There are no residences along Wells Mills Road in the vicinity of the site.

### **Statement of Issues**

This Health Consultation was initiated at the request of USEPA Region II in order to evaluate potential public health effects which should be considered in conjunction with the possible inclusion of the site on the National Priorities List (NPL). There has been no previous public health review, i.e. Public Health Assessment or Health Consultation, of the Southern Ocean Landfill.

The records of the New Jersey Department of Environmental Protection (NJDEP) were reviewed to assist in identifying any potential human exposure pathways at the SOLF site. The NJDEP files contain information which relates to sanitary landfill and NJPDES permit requirements; the files include reports of periodic monitoring of on-site ground water and leachate for primary pollutants, metals, and VOCs. No data on ambient air monitoring were found, nor was there any indication of off-site soil or sediment sampling. The NJDEP records which have been evaluated for this Health Consultation consist primarily of periodic ground water monitoring for metals and VOCs.

There is no municipal water supply system within ten miles of the landfill. There are, however, several potable water wells within one mile of the landfill. Data from the periodic sampling of nearby potable wells by the Ocean County Health Department have also been evaluated in this Health Consultation.

## **DISCUSSION**

### **Determination of Potential Exposure Pathways**

A completed human exposure pathway includes five elements: (1) there must be a source of contamination; (2) the toxic material must be delivered to the point of human exposure; (3) a point of exposure where there is contact with the contaminated medium must be present; (4) there must be a route of exposure, i.e. inhalation, ingestion, or dermal contact, to the toxic material; and (5) there must be an exposed population. Each of the five elements must be present in order for exposure to occur.

Due to the lack of one or more elements mentioned above, the exposure pathways which follow do not appear to have been completed when applied to the SOLF.

#### *Ingestion/Physical Contact with On-site Surface Water/Sediment*

On-site surface water run-off is directed towards Fire Pond and other on-site ponds. There is also a leachate collection and monitoring pond on the northern side of the landfill. In 1989, in conjunction with the site visit conducted by NUS, three surface water and three sediment samples were taken on the landfill property<sup>(7-8)</sup>. No contaminants were detected in the sediment samples. One of the surface water samples (taken from the so-called Fire Pond) showed traces of toluene, 2-butanone, phenol, and diethyl phthalate. Note: 2-butanone is also known as methyl ethyl ketone (MEK). Since the Fire Pond is located on the landfill property within the fence and was apparently never used, it is unlikely to have been the source of a completed exposure pathway.

#### *Ingestion/Physical Contact with Off-site Soil/Sediment/Surface Water*

There is no indication of contaminated off-site soil, sediment, or surface water which could lead to a completed exposure pathway through ingestion of, or physical contact with, contaminated media. The nearest residences are approximately 0.7 miles from the SOLF, and there has been no surface water runoff in the vicinity of inhabited areas. Nor is there any indication of off-site leachate seepage in the vicinity of the residences. In 1979 SOLF was cited for spilled sewage sludge flowing beyond the west site boundary near MP-2/ES-2. However, there is no record of the spill material having been tested for contaminants, and the diking around the site was subsequently improved. There are no residences along Wells Mills Road west of the landfill which might have been exposed to the sludge.

### **Potential Exposure Pathways**

#### *Inhalation of Ambient Air*

There has apparently been no measurement of contaminated ambient air. However, in the late 1970's and early 1980's, occasional complaints of "garbage" odor were filed with the Ocean County Health Department by local residents.

#### *Ingestion of Ground Water*

The primary issue of public health concern regarding the Southern Ocean Landfill relates to potential off-site ground water contamination. In order to monitor potential ground water contamination, a variety of shallow wells have been installed in the vicinity of SOLF. Nine on-site ground water monitoring wells (denoted MP-1 through MP-4, installed in 1975, and MP-5 through MP-9, installed in 1986) are currently sampled for VOCs and heavy metals, as are four off-site monitoring wells (ES-10D, ES-10S, ES-11D, and ES-11S, installed in 1994). As shown in Figure 2, the on-site monitoring wells have had varying designations at different times.

Monitoring wells MP-1 through MP-9, and ES-10S, ES-10D, ES-11S, and ES-11D are 4-39 feet deep; these wells sample the Cohansey Formation. There are additional on- and off-site wells (denoted PS-1 through PS-12) which were installed and sampled in the early 1980's, but which are apparently no longer used. These wells are 2-36 feet deep.

#### *Ground Water Analyses in 1981<sup>(2-6)</sup>*

Sampling of ground water from on- and off-site monitoring wells showed a variety of contaminants to have been present at levels of potential public health concern. In 1981 several separate analyses were conducted of samples from monitoring wells. The results of these analyses are shown in Tables 1 through 5. It is interesting to compare chlorinated contaminants found in PS-10, which samples ground water downgradient in vicinity of the pistol range/gravel borrow area, with contaminants found in PS-3, located south of SOLF along Brookville Road.

#### *Ground Water Sampling in 1989<sup>(7-8)</sup>*

In 1989 (after the landfill was closed) sampling of ground water was conducted in conjunction with a contracted USEPA site inspection. Analyses of samples from on-site monitoring wells showed several metals to be present in ground water from ES-4/MP-4. In the same sampling episode heavy metals and VOCs above the Maximum Contaminant Levels (MCLs) were found in ES-5/MP-5. The sampling results are given in Table 6. No sampling of off-site monitoring wells PS-3 and PS-10 was conducted.

#### *Ground Water Sampling in 1994<sup>(9)</sup>*

##### Monitoring Wells

Sampling of ground water from on- and off-site wells found contamination by heavy metals, primarily in MP-4/ES-4 and ES-11D (off-site), as shown by the results in Tables 7 and 8. Similar contamination by metals was detected in well ES-4 in 1989, cf. Table 6.

Sampling of on-site monitoring wells in 1994 showed contamination by benzene, 1,2-dichloropropane, and dichloroethylene in MP-5/ES-5, as indicated in Table 7. These contaminants were detected at higher concentrations in the same well (ES-5) in 1989, cf. Table 6. In addition, benzene and methylene chloride were found in off-site well ES-10D, as shown in Table 8.

##### Private Potable Wells

There are several private potable wells in the vicinity of the landfill, as shown in Figure 2. The potable wells are 90-160 feet in depth, and draw water from the Kirkwood Formation. The private potable wells along Brookville Road, i.e. south of SOLF, have been periodically tested by the Ocean County Health Department for chlorinated solvents and heavy metals<sup>(10)</sup>. The most recent sampling of these wells (1994) did not detect chlorinated solvents. Heavy

metals of concern which were detected are shown in Table 9. It should be noted that in 1988 potable water samples showed low pH and elevated levels of lead in several potable wells in the vicinity. At the time residents were advised to take measures to reduce lead in the potable water.

## CONCLUSIONS

Human exposure pathways associated with inhalation or physical contact with potential contaminants which have been identified at the Southern Ocean Landfill in soils, surface water, sediments, and ambient air are not considered probable, since contaminants have not been found in these media off the SOLF property.

The ground water monitoring data which have been evaluated regarding SOLF do not present a coherent picture of a plume of contaminated groundwater. However, different contaminants which exceed drinking water comparison values have been identified in several monitoring well samples at different times. Thus, although evidence of a plume of ground water contamination is limited, the potential for a completed human exposure pathway through ingestion of contaminated ground water does exist.

Sampling by the Ocean County Health Department of potable wells in the area does not indicate that exposure to site-related contamination through the ingestion of ground water has occurred in the past. The potable wells draw water from an aquifer which, is separate from, but is hydrogeologically coupled to, the aquifer which is sampled by the monitoring wells. As shown in Figure 2, ground water flow in the vicinity of the landfill is from west to east. Nearby residents rely exclusively on potable water wells, since no municipal water system serves the immediate area. Consequently, there is sufficient evidence to warrant concern for ingestion of contaminated potable water.

In general, the metals which were found in potable wells are at levels which are below ATSDR Comparison Values, and are not of public health concern. The level of lead detected at the Boy Scout Camp (the sample was taken directly from a garage spigot) is above the ATSDR Comparison Value. However, it is believed that the lead is not site-related, but that it is due to the acidity of the water (see Table 6).

It is possible that exposure dose, estimated using standard assumptions for ingestion of drinking water<sup>(11)</sup>, could approach levels of public health concern for several of the contaminants which have been identified in off-site monitoring wells.

The data and information developed in this health consultation have been evaluated to determine if follow-up health actions may be indicated. Further evaluation is needed to determine public health actions.

## RECOMMENDATIONS

The following public health actions are recommended regarding SOLF and the immediate vicinity:

- Based on the possibility of future contamination of potable water wells, private wells along Brookville Road as far as Jones Road should continue to be monitored for contamination by heavy metals and VOCs.

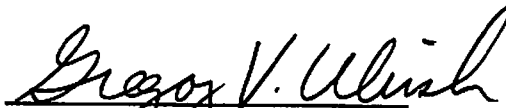
- The on- and off-site monitoring wells and the on-site lined leachate pond should also continue to be monitored quarterly for primary pollutants, heavy metals, and VOCs.

- As a result of the slightly elevated lead concentration in the Boy Scout Camp well, this well should be retested by the Ocean County Health Department to determine the "typical" lead concentration, or if it represents an isolated event. If elevated lead is found to recur, actions, such as providing an alternate water source, should be taken to eliminate the potential for exposure. The Ocean County Health Department should also provide information to well owners in the vicinity regarding the risks associated with lead in drinking water. Although occasional ingestion of lead at this (16 ppb) concentration is not expected to result in adverse health effects, the achievement of the maximum contaminant level goal (MCLG) for lead in drinking water should be encouraged.

- The present state of the SOLF (inactive, but not yet closed according to NJDEP regulations) is inconsistent with similar contaminated sites located within the Pinelands area. Since ground water is considered to be a primary natural resource of this area upon which area residents are dependent, off-site migration of contaminants is an ecological and potential public health concern. Consideration should be given to closing the landfill in a manner consistent with State regulations. The closure plan should provide remedial action which addresses ground water contamination in the context of the requirements of the Pinelands Commission.

## CERTIFICATION

The Health Consultation for the Southern Ocean County Landfill site was prepared by the New Jersey Department of Health under a cooperative agreement with the Agency For Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

  
Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR has reviewed this Health Consultation and concurs with its findings.

  
Division Director, DHAC, ATSDR



## APPENDICES

### Tables

1. *Contaminants in On-Site Monitoring Wells - April 1981*
2. *Contaminants in On-site Wells - June 3, 1981*
3. *Contaminants in Monitoring Wells - June 25, 1981*
4. *Contaminants in Monitoring Wells - October 1981*
5. *Contaminants in Off-site Monitoring Wells - November 1981*
6. *Contaminants in On-Site Monitoring Wells - 1989*
7. *Contaminants in On-site Monitoring Wells - 1994*
8. *Contaminants in Off-site Monitoring Wells- 1994*
9. *Heavy Metals in Potable Water Wells - 1994*

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1. *Southern Ocean Landfill Vicinity*
2. *Locations of Monitoring and Potable Wells*

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## **REFERENCES**

1. **ATSDR Drinking Water Comparison Values - 1995**
2. **Laboratory Report #11,233, Rossnagel & Associates, April 27, 1981**
3. **Laboratory Report #11,511, Rossnagel & Associates, June 3, 1981**
4. **Laboratory Report, Rossnagel & Associates, July 1981**
5. **Laboratory Report, New York Testing Laboratories, October 16, 1981**
6. **Laboratory Report, Betz, Converse, and Murdoch, November 12, 1981**
7. **Site Inspection Report, Volume 1, NUS Corporation, June 30, 1989**
8. **Site Inspection Report, Volume 2, NUS Corporation, June 30, 1989**
9. **Annual Monitoring Report - November 1994, Dames & Moore, January 9, 1995**
10. **Potable Well Monitoring - June 1994, Ocean County Health Department**
11. **ATSDR Public Health Assessment Guidance Manual, 1992**

## **Appendices**

**Table 1 - Contaminants in On-Site Monitoring Wells - April 1981 ( $\mu\text{g/l}$ )<sup>(2)</sup>**

Contaminant	Well #1 (ES-1)	Well #2 (ES-2)	Well #3 (ES-3)	Well #4 (ES-4)	Comparison Value
Benzene	<b>29</b>	--	--	--	1(CREG)
1,2-Dichloroethylene	<b>150</b>	--	--	16	10(NJMCL)
Ethylbenzene	26	--	--	--	700(USMCL)
Toluene	20	--	--	--	700(USMCL)
Vinyl Chloride	<b>30</b>	--	--	--	0.2(NJMCL)
Arsenic	37	15	10K	10K	0.02(CREG)
Cadmium	5K	5K	5K	5K	5(USMCL)
Chromium	3K	3K	3K	3K	100(USMCL)
Lead	100K	100K	100K	100K	15(USMCL)
Manganese	370	470	62	39	50(USMCL)
Mercury	2.5	2K	2K	2K	2(USMCL)

Entry in **BOLD** exceeds Drinking Water Comparison Value

CREG - Cancer Risk Evaluation Guide

K qualifier - less than Minimum Detectable Limit

NJMCL - New Jersey Maximum Contaminant Level

USMCL - USEPA Maximum Contaminant Level

-- not detected

**Table 2 - Contaminants in On-site Wells - June 3, 1981 ( $\mu\text{g/l}$ )<sup>(3)</sup>**

Contaminant	Well #1 (ES-1)	Well #2 (ES-2)	Well #3 (ES-3)	Well #4 (ES-4)	Comparison Value
Benzene	21	--	--	--	1(CREG)
1,2-Dichloroethylene	200	--	--	--	10(NJMCL)
Ethylbenzene	24	--	--	--	700(USMCL)
Toluene	26	--	--	--	700(USMCL)
Vinyl Chloride	--	--	--	--	0.2(NJMCL)
Arsenic	37	67	20	34	0.02(CREG)
Cadmium	10K	10K	10K	10K	5(USMCL)
Chromium	60	210	70	70	100(USMCL)
Lead	100K	120	100K	100K	15(USMCL)
Manganese	190	550	72	150	50(USMCL)
Mercury	NA	NA	NA	NA	2(USMCL)

Entry in **BOLD** exceeds Drinking Water Comparison Value

CREG - Cancer Risk Evaluation Guide

K qualifier - less than Minimum Detectable Level

NA - not analyzed

NJMCL - New Jersey Maximum Contaminant Level

USMCL - USEPA Maximum Contaminant Level

-- Not detected

**Table 3 - Contaminants in Monitoring Wells - June 25, 1981 ( $\mu\text{g/l}$ )<sup>(4)</sup>**

Contaminant	Well #1 (ES-1)	Well #2 (ES-2)	Well #3 (ES-3)	Well #4 (ES-4)	PS-2	PS-3	PS-6	CV
Benzene	17	--	--	7	--	35	--	1(CREG)
1,2-Dichloroethylene	125	--	--	16	2	--	--	10(NJMCL)
Ethylbenzene	--	--	--	--	--	11	--	700(USMCL)
Toluene	--	--	--	--	--	--	--	700(USMCL)
Vinyl Chloride	--	--	--	--	--	--	--	0.2(NJMCL)
Arsenic	120	54	31	17	17	24	NA	0.02(CREG)
Cadmium	15	16	10K	10K	10	10K	NA	5(USMCL)
Chromium	300	190	86	50K	61	59	NA	100(USMCL)
Lead	210	160	130	110	90	80	NA	15(USMCL)
Manganese	250	310	62	80	210	170	NA	50(USMCL)
Mercury	NA	NA	NA	NA	2K	2K	NA	2(USMCL)

Entry in **BOLD** exceeds Drinking Water Comparison Value

CREG - Cancer Risk Evaluation Guide

K qualifier - less than Minimum Detectable Limit

NA - not analyzed

NJMCL - New Jersey Maximum Contaminant Level

USMCL - USEPA Maximum Contaminant Level

-- not detected

**Table 4 - Contaminants in Monitoring Wells - October 1981 ( $\mu\text{g/l}$ )<sup>(5)</sup>**

Contaminant	ES-1	ES-2	ES-3	ES-4	PS-2	PS-3	PS-10	PS-11	PS-12	CV
Benzene	--	--	--	<b>24</b>	--	<b>48</b>	--	--	<b>12</b>	1(CREG)
Chloroform	26	--	--	--	--	--	--	--	--	100(USMCL)
Manganese	<b>117</b>	33	<b>308</b>	<b>258</b>	--	--	--	--	--	50(USMCL)

Note: Wells PS-3, PS-10, and PS-11 are off-site.  
 Entry in **BOLD** exceeds Drinking Water Comparison Value  
 CREG - Cancer Risk Evaluation Guide  
 USMCL - USEPA Maximum Contaminant Level  
 -- Not Detected



**Table 5 - Contaminants in Off-site Monitoring Wells - November 1981 ( $\mu\text{g/l}$ )<sup>(6)</sup>**

Contaminant	PS-3	PS-10	Comparison Value
Benzene	<b>59</b>	--	1 (CREG)
Chlorobenzene	<b>200</b>	--	100 (USMCL)
Chloroethane	28	10	NONE
1,2-Dichloroethylene	--	11	10 (NJMCL)
1,2-Dichloropropane	--	<b>19</b>	5 (USMCL)
Ethylbenzene	24	--	700 (USMCL)
Methylene Chloride	--	<b>23</b>	2 (NJMCL)
Tetrachloroethylene	--	<b>240</b>	1 (NJMCL)
1,1,1-Trichloroethane	--	22	200 (USMCL)
Vinyl Chloride	--	13	0.7 (CREG)
Arsenic	<b>23</b>	--	0.02 (CREG)

Entry in **BOLD** exceeds Drinking Water Comparison Value

CREG - Cancer Risk Evaluation Guide

NJMCL - New Jersey Maximum Contaminant Level

USMCL - USEPA Maximum Contaminant Level

-- Not Detected

**Table 6 - Contaminants in On-Site Monitoring Wells - 1989 ( $\mu\text{g/l}$ )<sup>(7)</sup>**

Contaminant	ES-3	ES-4	ES-5	ES-6	Comparison Value
Benzene	--	--	17	--	1(CREG)
1,2-Dichloroethylene	--	--	<b>64</b>	--	10(NJMCL)
1,2-Dichloropropane	--	--	<b>310</b>	--	5(USMCL)
Arsenic	<b>11.9</b>	--	--	--	0.02(CREG)
Cadmium	--	<b>19.9</b>	<b>16.2</b>	--	5(USMCL)
Chromium	--	<b>168</b>	66.1	62	100(USMCL)
Lead	7.8	<b>663</b>	<b>26.4</b>	<b>22.4</b>	15(USMCL)
Manganese	<b>167</b>	<b>183</b>	<b>86.2</b>	<b>566</b>	50(USMCL)
Mercury	--	<b>3.7</b>	0.24	0.34	2(USMCL)

Entry in **BOLD** exceeds Drinking Water Comparison Value

CREG - Cancer Risk Evaluation Guide

NJMCL - New Jersey Maximum Contaminant Level

USMCL - USEPA Maximum Contaminant Level

-- Not Detected

**Table 7 - Contaminants in On-site Monitoring Wells - 1994 ( $\mu\text{g/l}$ )<sup>(6)</sup>**

Contaminant	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	MP-8	MP-9	Comparison Value
Benzene	2.0	0.3K	1.2	0.3K	3.5	5.9	0.3K	0.3K	0.3K	1(CREG)
Chlorobenzene	3.9	0.3K	2.4	0.3K	5.4	2.8	0.3K	0.3K	0.3K	100(USMCL)
1,2-Dichloroethylene	1.0K	1.0K	1.0K	1.0K	44	1.0K	1.0K	1.0K	1.0K	10(NJMCL)
1,2-Dichloropropane	0.3K	0.3K	0.3K	0.3K	64	0.3K	0.3K	0.3K	0.3K	5(USMCL)
Methylene Chloride	0.9K	0.9K	0.9K	0.9K	0.9K	0.9K	0.9K	0.9K	0.9K	2(NJMCL)
Trichloroethylene	0.3K	0.3K	0.3K	0.3K	0.5	0.3K	0.3K	0.3K	0.3K	1(NJMCL)
Vinyl Chloride	0.7K	0.7K	0.7K	0.7K	3.7	0.7K	0.7K	0.7K	0.7K	0.7(CREG)
Arsenic	43.0	4.4	--	156	65.3	68.1	5.6	2.6	39.4	0.02(CREG)
Chromium	5.8K	5.8K	--	412	5.8K	5.8K	10.0	5.8K	5.8K	100(USMCL)
Lead	11.0	17.1	--	425	6.7	7.4	10.7	2.1K	2.1K	15(USMCL)
Manganese	102	90.8	--	421	94.6	316	22.9	48.8	30.7	50(USMCL)
Mercury	0.09K	0.46	--	18.0	0.09K	0.09K	0.09K	0.09K	0.09K	2(USMCL)

Entry in **BOLD** exceeds Drinking Water Comparison Value  
 CREG - Cancer Risk Evaluation Guide  
 K qualifier - less than Minimum Detectable Limit  
 NJMCL - New Jersey Maximum Contaminant Level  
 USMCL - USEPA Maximum Contaminant Level  
 -- Not Measured

**Table 8 - Contaminants in Off-site Monitoring Wells - 1994 ( $\mu\text{g/l}$ )<sup>(9)</sup>**

Contaminant	ES-10S	ES-10D	ES-11S	ES-11D	Comparison Value
Benzene	0.3K	<b>22</b>	0.3K	0.3K	1 (CREG)
Chlorobenzene	0.3K	12	0.3K	0.3K	100 (USMCL)
1,2-Dichloroethylene	1.0K	8.7	1.0K	1.0K	10 (NJMCL)
1,2-Dichloropropane	0.3K	0.3K	0.3K	0.3K	5 (USMCL)
Methylene Chloride	0.9K	<b>36</b>	0.9K	0.9K	2 (NJMCL)
Trichloroethylene	0.3K	1.9	0.3K	0.3K	1 (NJMCL)
Vinyl Chloride	0.7K	<b>6.9</b>	0.7K	0.7K	0.7 (CREG)
Arsenic	<b>2.6</b>	<b>2.6</b>	<b>15.9</b>	<b>53.4</b>	0.02 (CREG)
Chromium	5.8K	5.8K	18.4	<b>367</b>	100 (NJMCL)
Lead	2.7	2.1	12.5	<b>166</b>	15 (USMCL)
Manganese	<b>357</b>	39.8	44.0	<b>111</b>	50 (NJMCL)
Mercury	0.09K	0.09K	0.26	1.6	2 (NJMCL)

Entry in **BOLD** exceeds Drinking Water Comparison Value

CREG - Cancer Risk Evaluation Guide

K qualifier - less than Minimum Detectable Limit

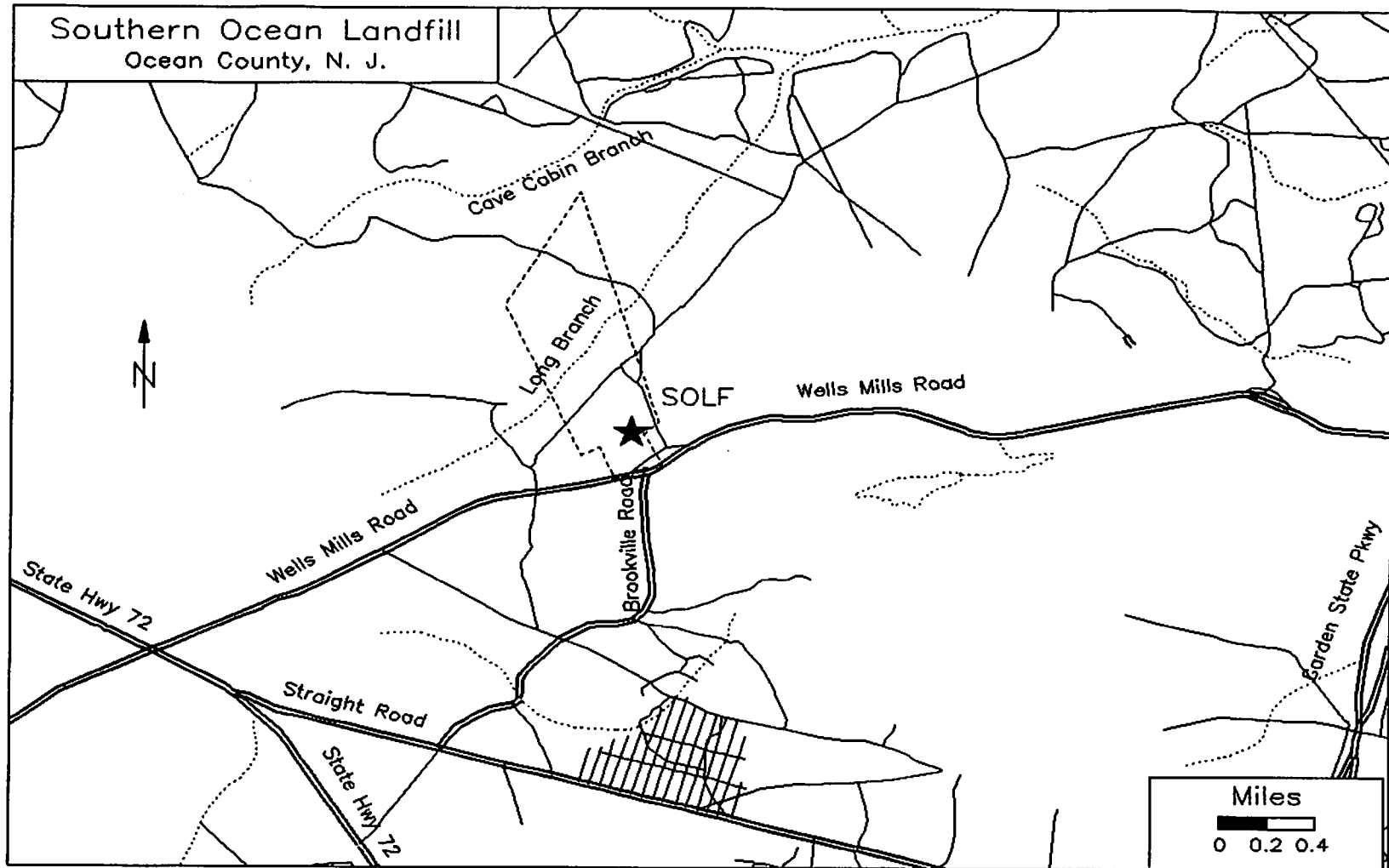
NJMCL - New Jersey Maximum Contaminant Level

USMCL - USEPA Maximum Contaminant Level

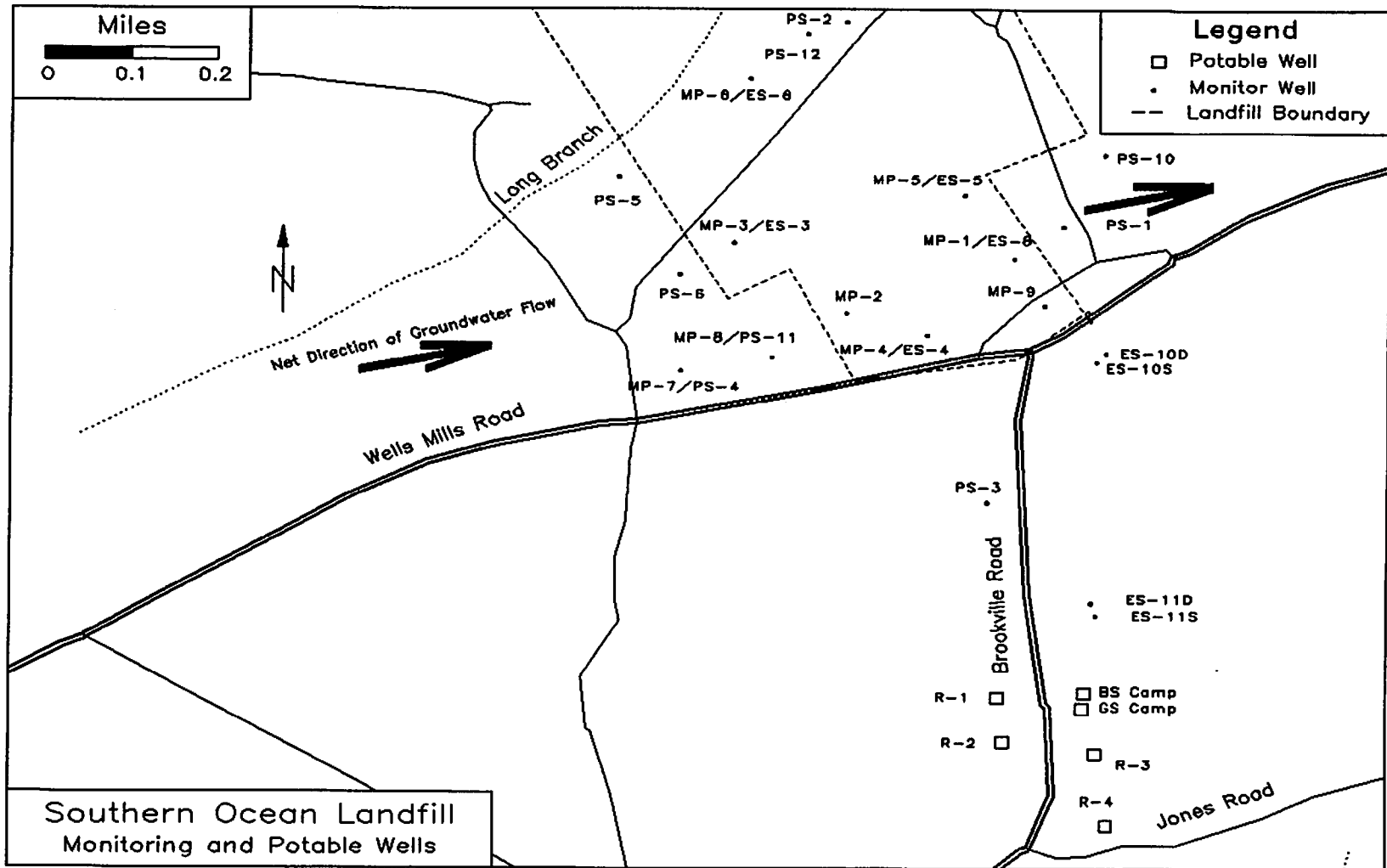
**Table 9 - Heavy Metals in Potable Water Wells - 1994 ( $\mu\text{g/l}$ )<sup>(10)</sup>**

Contaminant	Boy Scout	Girl Scout	Residence 1	Residence 2	Residence 3	Residence 4	Comparison Value
Cadmium	0.9K	0.9K	0.9K	0.9K	0.9K	0.9K	5(USMCL)
Chromium	3K	3K	3K	3K	3K	3K	100(USMCL)
Lead	<b>16</b>	2K	3	2K	4	4	15(USMCL)
pH	5.1	7.6	5.1	6.2	6.5	5.6	--

Entry in **BOLD** exceeds Drinking Water Comparison Value  
 K qualifier - less than Minimum Detectable Limit  
 USMCL - USEPA Maximum Contaminant Level



**Figure 1 - Southern Ocean Landfill Vicinity**



**Figure 2 - Locations of Monitoring and Potable Wells**