BRIGHT STEPS CHILDREN DAY CARE (PWS #4010180)
SOURCE WATER ASSESSMENT FINAL REPORT

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State of Idaho
Department of Environmental Quality

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Executive Summary

Under the federal Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. The assessment for your particular system is based on a land use inventory of the designated source water area, sensitivity factors associated with each well, and characteristics of the aquifer that supplies your community with drinking water.

This report, *Source Water Assessment for the Bright Steps Children Day Care, located in Boise, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within those boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Bright Steps Children Day Care (PWS #4010180) drinking water system consists of a single well. Well #1 rated an overall high susceptibility to inorganic compounds (IOCs), volatile organic compiunds (VOCs), synthetic organic compounds (SOCs), and microbial contaminants. This rating is due to the presence of a potential contaminant source, Amity Road, within a 50-foot radius of the wellhead.

The system has never tested positive for any of the VOCs or SOCs regulated under the Safe Drinking Water Act. The IOCs nitrate, arsenic, and fluoride have been detected in various samples, but at levels below the current maximum contaminant levels (MCLs) for each compound, respectively. Nitrate levels have averaged 3.6 parts per million (ppm) since 1993, never approaching the MCL for nitrate of 10.0 ppm.

However, there has been a recent abundance of positive routine bacteria samples collected from the water system. Since May of 1998, a total of eleven samples have contained total coliform bacteria. These samples have been obtained from both the distribution system and the well. Three of these instances also resulted in positive test results for fecal coliform bacteria, two of these originating from the well bore. In addition, one well sample in May of 1998 contained *Escherichia coli*. The presence of bacteria within the drinking water system constitutes a public health threat and the Bright Steps Children Day Care may need to investigate various disinfection methods so the health of the day care can be preserved. Because a significant number of the contaminated samples were obtained from the well, the source water itself may be tainted.

Although contaminant levels in the drinking water system have never exceeded current MCLs for any of the IOCs, VOCs, or SOCs regulated under the Safe Drinking Water Act, the Bright Steps Children Day Care should be aware that the potential for contamination still exists. Within the region immediately adjacent to the well, the predominant land use is irrigated agriculture. These regions are considered by the Idaho Department of Environmental Quality (DEQ) to be potentially vulnerable to ground water contamination due to the leaching properties of agricultural chemicals once they are applied to the surrounding farmland. Additionally, the designated drinking water capture zone passes through a DEQ designated Group 1 Priority Area for the pesticides atrazine and alachlor. The well may

be subject to these pollutants since they are relatively abundant in the region.

The remainder of the delineated area is almost entirely developed for urban and commercial land uses. These areas are subject to their own set of possible problems, especially from storm water runoff, improper household hazardous waste disposal methods, septic system effluent, and industrial pollution discharges, to name several. These land uses collectively tended to increase the susceptibility scores for the Bright Steps Children Day Care.

The delineated source water area contains several potential sources of concern. Within approximately 375 feet of the well bore, Eight Mile Creek is located. According to the 2000 Ground Water Under Direct Influence (GWUDI) field survey performed by the Central District Health Department, Eight Mile Creek may be hydraulically connected to the well. Therefore, for the purposes of the susceptibility analysis, the creek was considered a possible pathway to pollution.

For the remainder of the drinking water capture zone, the greatest potential pollutant source of concern is a wastewater land application (WLAP) site where municipal wastewater sludge is applied to a field at the southeast corner of Amity and Maple Grove roads. This site was considered a possible source of IOC pollution from nitrates. The remainder of the potential sources of contamination, along with the class of contaminants stored on site are listed in Table 1 on page 21.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Bright Steps Children Day Care, drinking water protection activities should first focus on continued maintenance of the sanitary seal and distribution system. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

Any spills occurring on Amity Road should be monitored and dealt with expeditiously. Additionally, there should be a focus on implementation of practices aimed at reducing the leaching of agricultural chemicals within the 3-year TOT zone. The system may also want to cooperate with the business owners of the potential contaminant sources within the delineated drinking water capture zone to encourage the use of pollution prevention activities and specific best management practices (BMPs).

Because a large portion of the ground water capture zone is outside the direct jurisdiction of the Bright Steps Children Day Care, the creation of partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. Should microbial contamination continue to be a problem, appropriate disinfection practices would need to be implemented to ensure the health of the Bright Steps Children Day Care.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan, especially since the delineation contains some urban and residential land uses. Public

education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few.

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the U.S. Environmental Protection Agency. In addition, because a major transportation corridor (Amity Road) passes through the delineation, the Idaho Department of Transportation should be involved in any protection measures. Drinking water protection practices dealing with agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Ada County Soil Conservation District, and the Natural Resources Conservation Service.

A community should incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, water conservation, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality at 373-0550 or the Idaho Rural Water Association at 1-800-962-3257.

SOURCE WATER ASSESSMENT FOR THE BRIGHT STEPS CHILDREN DAY CARE, BOISE, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report (Attachment A, pages 18-21). The list of significant potential contaminant source categories and their rankings used to develop the assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess each drinking water source in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act Amendments of 1996. This assessment is based on a land use inventory of the delineated source water area, sensitivity factors associated with each well, and aquifer characteristics. Since there are over 2,900 public water sources in Idaho, there is limited time and resources available to accomplish the assessments. All of these assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Bright Steps Children Day Care is a non-community non-transient public drinking water system serving approximately 54 people that is located in Ada County on Amity Road between Cloverdale Road and South Five Mile Road in Boise, Idaho (Figure 1, page 19). Residents receive their water from a single well.

The primary water quality issue currently facing the Bright Steps Children Day Care is the recent positive routine bacteria samples collected from the water system. Since May of 1998, a total of eleven samples have contained total coliform bacteria. These samples have been obtained from both the distribution system and the well. Three of these instances also resulted in positive test results for fecal coliform bacteria, two of these originating from the well bore. In addition, one well sample in May of 1998 contained *Escherichia coli*. The presence of bacteria within the drinking water system constitutes a public health threat and the Bright Steps Children Day Care may need to investigate various disinfection methods so the health of the day care can be preserved. Because a significant number of the contaminated samples were obtained from the well, the source water itself may be tainted.

The system has never tested positive for any of the VOCs or SOCs regulated under the Safe Drinking Water Act. The IOCs nitrate, arsenic, and fluoride have been detected in various samples, but at levels below the current MCLs for each compound, respectively. Nitrate levels have averaged 3.6 ppm since 1993, never approaching the MCL for nitrate of 10.0 ppm.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (regions indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. DEQ contracted with BARR Engineering to perform the delineations using a combination of MODFLOW and a refined analytical element computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Boise Valley aquifer. The computer model used site specific data, assimilated by BARR Engineering from a variety of sources including area well logs, the Treasure Valley Hydrologic Project, and hydrogeologic reports (detailed below in Section 3).

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with these possible contamination sources, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are

located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in October and November of 2001. The first phase involved identifying and documenting potential contaminant sources within the Bright Steps Children Day Care source water assessment area (Figure 2, page 20) through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the system representative, Heather Hooper, to validate the sources identified in phase one and to add any additional potential sources in the area.

The delineated source water area contains several potential sources of concern. Immediately adjacent to the water system, Amity Road passes within approximately 30 feet of the wellhead. Because Amity Road serves as an important transportation thoroughfare for the region and is positioned inside the sanitary setback region, or Zone 1A, the water system automatically rated a high overall susceptibility to all classes of contaminants.

Within the 3-year TOT zone, Eight Mile Creek is located approximately 375 feet east of the wellhead. According to the 2000 Ground Water Under Direct Influence (GWUDI) field survey performed by the Central District Health Department, Eight Mile Creek may be hydraulically connected to the well. Therefore, for the purposes of the susceptibility analysis, the creek was considered a possible pathway to pollutants. Two businesses, a painting company and a building contractor also lie within Zone 1B.

For the 6-year TOT zone, the greatest potential pollutant source of concern is a wastewater land application (WLAP) site where municipal wastewater sludge is applied to a field at the southeast corner of Amity and Maple Grove roads. This site was considered a possible source of IOC pollution from nitrates. The remainder of the potential sources of contamination, along with the class of contaminants stored on site are listed in Table 1 on page 21.

Section 3. Hydrologic Conditions of the Treasure Valley

Treasure Valley Hydrologic Project Information (Petrich and Urban, 1996; Neely and Crockett, 1998; Petrich et al., 1999)

The "Treasure Valley" is a geopolitical region that includes the lower Boise River sub-basin. The lower Boise River sub-basin begins where the Boise River exits the mountains near the Lucky Peak Reservoir. From Lucky Peak Dam the lower Boise River flows about 64 (river) miles northwestward through the Treasure Valley to its confluence with the Snake River. The Treasure Valley Hydrologic Project area encompasses the lower Boise River area, and extends south to the Snake River. The southern area is included in the study area because of ground water flow from the Lower Boise River basin south toward the Snake River.

Significant amounts of desert area were converted to flood irrigated agriculture beginning in the 1860s. Irrigation led to increases in shallow ground water levels in some regions. These shallow ground water levels provided an inexpensive and readily obtainable source of water supply that is used

extensively throughout the valley. Much of the population growth in the Treasure Valley has been occurring in previously flood-irrigated agricultural areas, resulting in increased pumpage and a reduction in local aquifer recharge. In addition, irrigation in some areas has become more efficient, reducing the amount of irrigation-related infiltration. Decreasing aquifer recharge and increasing pumpage is thought to be contributing to the decline of ground water levels in some areas.

The Treasure Valley experiences a temperate and arid-to-semiarid climate. Average high temperatures range from about 90°F in summer to 36°F in winter; low temperatures range from about 20°F in winter to about 56°F in summer. The average precipitation ranges from about 8 to 14 inches throughout most of the valley, most of which falls during the colder months in the form of snow in higher elevations and rain in the low-lying valleys.

Major surface water bodies include the Boise River, Lake Lowell, and Lucky Peak Reservoir. The primary source of surface water in the Treasure Valley is the high elevation area in the Boise River basin upstream of Lucky Peak Dam. Much of the spring runoff from the snow pack in high elevation areas is stored in three reservoirs: Anderson Ranch Reservoir, Arrowrock Reservoir, and Lucky Peak Reservoir.

Regional cropland is irrigated primarily with surface water through an extensive network of reservoirs and canals. The first canals were constructed in the 1860's; there are now over 1,100 miles of major and intermediate canals in the Treasure Valley, the majority of which are owned and maintained by canal companies and irrigation districts. Primary sources of irrigation water in the Treasure Valley include the Boise, Snake, and Payette Rivers.

Hydrogeology (from Petrich et al., 1999)

The lower Boise River sub-basin (Treasure Valley) is located within the northwest-trending topographic depression known as the western Snake River Plain. The western Snake River Plain is a relatively flat lowland separating Cretaceous granitic mountains of west-central Idaho from the granitic/volcanic Owyhee mountains in southwestern Idaho. The western Snake River Plain extends from about Twin Falls, Idaho northwestward to Vale, Oregon. The Snake River Plain is about 30 miles wide in the section containing the lower Boise River.

Historically, sediments originating from the surrounding mountains began accumulating on top of thick, basal basalts. Rifting and continued subsidence maintained the lowland topography, leading to the additional accumulation of water and sediments (Othberg, 1994). Basin infilling by sediments and basalt occurred from the late Miocene through the late Pliocene (Othberg, 1994). Incision caused by flowing water in major drainages (e.g., Snake and Boise Rivers) began in the late Pliocene or early Pleistocene, although deposition of coarse sediments continued during Quaternary glaciations (Othberg, 1994).

Several Quaternary basalt flows have been described in the western Snake River Plain, and have been assigned to the upper Snake River Group (Malde, 1991; Malde and Powers, 1962). Lava flowed across portions of the ancestral Snake River Valley (Malde, 1991) in an area that is now south of the Boise River. The Snake River then changed course, incising at its present location along the southern margin of the basalt flows. More recent eruptions (from Kuna Butte and other local sources) spilled lava into the canyon south of Melba. The Snake River has since incised this basalt (Malde, 1991).

The general stratigraphy of the western Snake River Plain consists of (from top to bottom) a thick layer of sedimentary deposits underlain by a thick series of basalt flows, which in turn are underlain by older, tuffaceous sediments and basalt (Malde, 1991; Clemens, 1993). The upper thick zone of sediments (up to approximately 6,000 feet thick) distinguishes the western Snake River Plain from the eastern Snake River Plain, in which the upper section is primarily Quaternary basalt (Wood and Anderson, 1981).

The uppermost sediments and basalt belong to the Pleistocene-age Snake River Group. The Snake River Group consists of terrace sediments, Quaternary alluvium, and Pleistocene basalt flows (Wood and Anderson, 1981). Snake River Group sediments and basalts cover much of the project area (Othberg and Stanford, 1992).

The Snake River Group overlies the Idaho Group sediments. The Idaho Group sediments can be divided into two general parts (Wood and Anderson, 1981). The lower Idaho Group contains sediments described as lake and stream deposits of buff white, brown, and gray sand, silt, clay, diatomite, numerous thin beds of vitric ash, and some basaltic tuffs. The upper part of the lower Idaho Group also contains some local, thin, basalt flows. The upper Idaho Group consists of sands, claystones, and siltstones, but differs from the lower Idaho Group in that it contains a greater percentage of coarser-grained materials. The upper Idaho Group sediments are associated with a fluvial/deltaic/lacustrine depositional environment; the lower Idaho Group sediments were deposited in more of a lacustrine/deltaic environment (Wood, 1994).

Wood (1994) identified a buried lacustrine delta within the Idaho Group sediments in the Nampa-Caldwell area. The location of the delta in the middle of the western Snake River Plain suggests that the eastern part of the Boise River basin was delta plain and flood plain at the time of deposition, while the western part was a deep lake environment. The delta probably prograded northwestward into a lake basin 830 feet deep, based upon high resolution seismic reflection data and resistivity log interpretations. The delta-plain and front sediments were shown to be mostly fine-grained, well-sorted sand with thin layers of mud (Wood, 1994). The northwest trend of the delta indicates a sediment source to the southeast, such as where the Snake River flows today (Wood, 1994).

A substantial, laterally extensive layer of clay is found at depths of 300 to 700 feet below ground surface. The clay is important because it represents, in some areas, a significant aquitard separating shallow overlying aquifers from deeper zones. The clay, often described in well logs as having a blue or gray color, has been observed as far west as Parma, and as far east as Boise (although the clay is not found in the extreme eastern portions of the Treasure Valley). The clay varies from a few feet to a few hundred feet in thickness. Although significant layers of clay are present throughout the Idaho Group sediments, individual clay units are not necessarily continuous over large areas. Also, the top of the clay can vary in elevation by up to approximately 200 feet in some locations, such as in an area west of Lake Lowell. In general, sediments above the "blue clay" are coarser-grained than the interbedded sands, silts, and clays underlying the "blue clay."

The top of the upper Idaho Group is marked in several parts of the Treasure Valley by a widespread fluvial gravel deposit known as the Tenmile gravels. Tenmile gravels contain rounded granitic rocks and felsic porphyries originating from the Idaho Batholith to the north and northeast. The Tenmile gravels range up to 500 feet in thickness along the Tenmile Ridge south of Boise, but are less than 50

feet thick in the Nampa-Caldwell area (Wood and Anderson, 1981).

Aquifer Systems and Hydrogeologic Characteristics

Ground water for municipal, industrial, rural domestic, and irrigation uses in the Treasure Valley is drawn almost entirely from Snake River Group and Idaho Group aquifers. Many domestic wells draw water from shallow aquifers, such as those in the Snake River Group deposits. Larger production wells (for municipal and agricultural uses) draw water from the deeper Idaho Group sediments.

Aquifers contained in the Snake River and Idaho Group sediments comprise shallow and regional ground water flow systems. Shallow aquifers contained in Snake River Group sediments and basalts may belong to local flow systems. Most local flow system recharge stems from irrigation infiltration and channel (e.g., streams or canals) losses. Discharge from shallow, local flow systems often is to local drains or streams. The time from recharge to discharge in shallow flow systems (residence times) probably ranges from days to tens of years.

In contrast, regional ground water flow systems extend much deeper than local flow systems. The Treasure Valley regional flow system begins in the eastern part of the valley, as indicated by downward hydraulic gradients in the Boise Fan sediments (Squires et al., 1992). Some water also enters the regional flow system as underflow from the Boise Foothills in the northeastern part of the valley. The regional flow system is thought to discharge primarily to the Boise and Snake Rivers in the western and southwestern parts of the valley.

Aquifer material characteristics, material heterogeneity, and structural controls influence Treasure Valley ground water flow. Coarse-grained materials (e.g., sand and gravel) in upper zones are more capable of transmitting ground water than fine-grained sediments (e.g., silt and clay). Clay and silt in the Snake River sediments can restrict vertical and/or horizontal ground water movement. Perched aquifers are created when fine-grained lenses impede downward vertical flow. A distinctive clay layer, sometimes referred to as "blue clay," is present over large portions of the valley. The clay is absent in the easternmost portions of the lower Boise River Basin, but can reach a thickness of more than 200 feet toward the central and western portions of the basin.

Sequences of interbedded sand, silt, and clay, such as the Deer Flat Surface and the upper portion of the Glenns Ferry Formation of the upper Idaho Group in the Nampa-Caldwell area, are the major water-producing aquifers in a large part of Canyon County (Anderson and Wood, 1981). The coarse-grained sediments in this zone produce water in excess of 2,000 gallons per minute (gpm).

The delineated source water assessment area for the Bright Steps Children Day Care can best be described as an eastward trending corridor approximately four miles long and one-quarter mile wide (Figure 2, page 20). The actual data used by BARR Engineering in determining the source water zones of contribution are available from DEQ upon request.

Section 4. Susceptibility Analysis

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according

to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment B on pages 22 & 23 contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: 1) the surface soil composition, 2) the material in the vadose zone (region between the land surface and the water table), 3) the depth to first ground water, and 4) the presence of a 50-foot thick impermeable zone above the production interval of the well. Slowly draining fine-grained soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel.

For the Bright Steps Children Day Care, regional soil information indicates the presence of moderate to well-draining soils within the delineated region. These soils generally provide less protection to the source water by allowing for a more rapid downward movement of contaminants in the unlikely event of a spill or release.

The hydrologic sensitivity ranked high for the well (Table 2). This rating is due, in part, to the fact that DEQ was unable to obtain a relevant well log for the Bright Steps Children Day Care well. Well logs contain valuable information concerning below ground hydrogeologic conditions. Because this information was not available, the high hydrologic sensitivity ranking is somewhat conservative.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have a better buffering capacity. In addition, if the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less probable. Also, if the wellhead is protected from surface flooding and is outside the 100-year floodplain, then the likelihood of contamination from surface events is reduced.

A well log was not available for the Bright Steps Children Day Care water system. Therefore, valuable information regarding the annular seal, casing properties, well production intervals, and specific hydrologic conditions are not known. As a result, the system construction score was rated as moderately susceptible to pollutants. According to the 1997 sanitary survey carried out by the Central District Health Department, the surface well seal was in compliance. This, in turn, slightly lowered the system construction score to moderate (Table 2, page 13).

Potential Contaminant Source and Land Use

In terms of the potential contaminant source/land use score, the well rated moderate for IOCs (i.e. nitrates, arsenic), VOCs (i.e. petroleum products), and microbial contaminants (i.e. bacteria), and high for SOCs (i.e. pesticides). Within the 3-year TOT zone, the predominant land use is irrigated agriculture. These regions are considered by DEQ to be potentially vulnerable to ground water contamination due to the leaching properties of agricultural chemicals once they are applied to the surrounding farmland. The remainder of the delineated drinking water capture zone is almost entirely developed for urban and commercial land uses. These areas are subject to their own set of problems, especially from storm water runoff, improper houschold hazardous waste disposal methods, and industrial pollution discharges, to name a few. These land uses collectively tended to increase the susceptibility scores for the Bright Steps Children Day Care.

The presence of several potential contaminant sources within the delineated region also elevated these rankings. Within Zone 1A, an important transportation thoroughfare, Amity Road passes within 30 feet of the well bore. The presence of the road within Zone 1A automatically ranked the system highly susceptible to all categories of contaminants.

There are a number other sources of concern within the delineated capture zone, including the aforementioned WLAP site, and numerous businesses (Table 2, page 13). Additionally, the 2000 GWUDI located a pasture with several horses positioned just over 50 feet from the wellhead. This pasture was also included in the susceptibility analysis as a possible source of IOC and microbial contaminants.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a repeat detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will lead to an automatically high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) and the presence of agricultural land contribute greatly to the overall ranking.

The Bright Steps Children Day Care water system could have rated a lower overall susceptibility if a 50-foot radius circle around the wellhead was clear of possible sources of contamination. Furthermore, if a well log could have been incorporated into the susceptibility analysis, the overall rankings would have probably been further reduced. Instead, the system rated a high overall susceptibility to all four classes of contaminants (Table 2, page 13).

Table 2. Summary of the Bright Steps Children Day Care Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	M	M	H	M	H	H*	H*	H*	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Automatically rated a High susceptibility due to the presence of Amity Road within Zone 1A.

Susceptibility Summary

The presence of Amity Road within 30 feet of the wellhead automatically ranked the system high for all contaminant categories. Nevertheless, the high hydrologic sensitivity and moderate system construction scores would have combined to give the well a high overall rating for all pollutants, even though relatively few potential contaminant sources exist in the 3-year TOT zone. There have been numerous positive bacteria samples collected from the well and distribution system, and this appears to be a problem that the Bright Steps Children Day Care will have to contend with. On a brighter note, no VOCs or SOCs have ever been detected in the well water at any measurable level.

Section 5. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Bright Steps Children Day Care, drinking water protection activities should first focus on continued maintenance of the sanitary seal and distribution system. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

Any spills occurring on Amity Road should be monitored and dealt with expeditiously. Additionally, there should be a focus on implementation of practices aimed at reducing the leaching of agricultural chemicals within the 3-year TOT zone. The system may also want to cooperate with the business owners of the potential contaminant sources within the delineated drinking water capture zone to encourage the use of pollution prevention activities and specific best management practices (BMPs).

Because a large portion of the ground water capture zone is outside the direct jurisdiction of the Bright

Steps Children Day Care, the creation of partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. Should microbial contamination continue to be a problem, appropriate disinfection practices would need to be implemented to ensure the health of the Bright Steps Children Day Care.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan, especially since the delineation contains some urban and residential land uses. Public education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few.

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the U.S. Environmental Protection Agency. In addition, because a major transportation corridor (Amity Road) passes through the delineation, the Idaho Department of Transportation should be involved in any protection measures. Drinking water protection practices dealing with agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Ada County Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502

Website: http://www2.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with wellhead protection strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) - Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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Attachment A

Delineation Figures and Potential Contaminant Source Table for the Bright Steps Children Day Care

FIGURE 1: Geographic Location of Bright Steps Childrens Day Care

PWS# 4010180

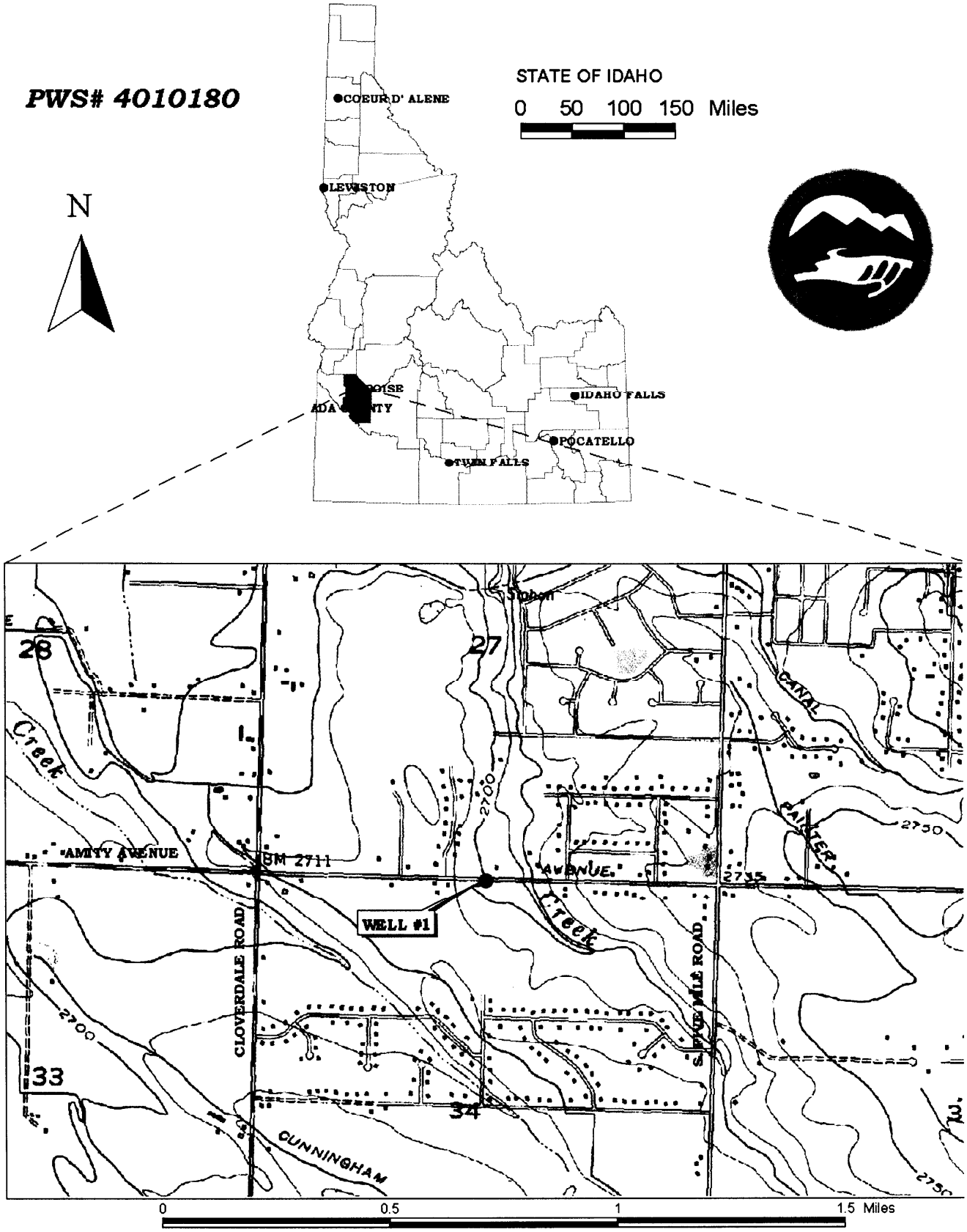
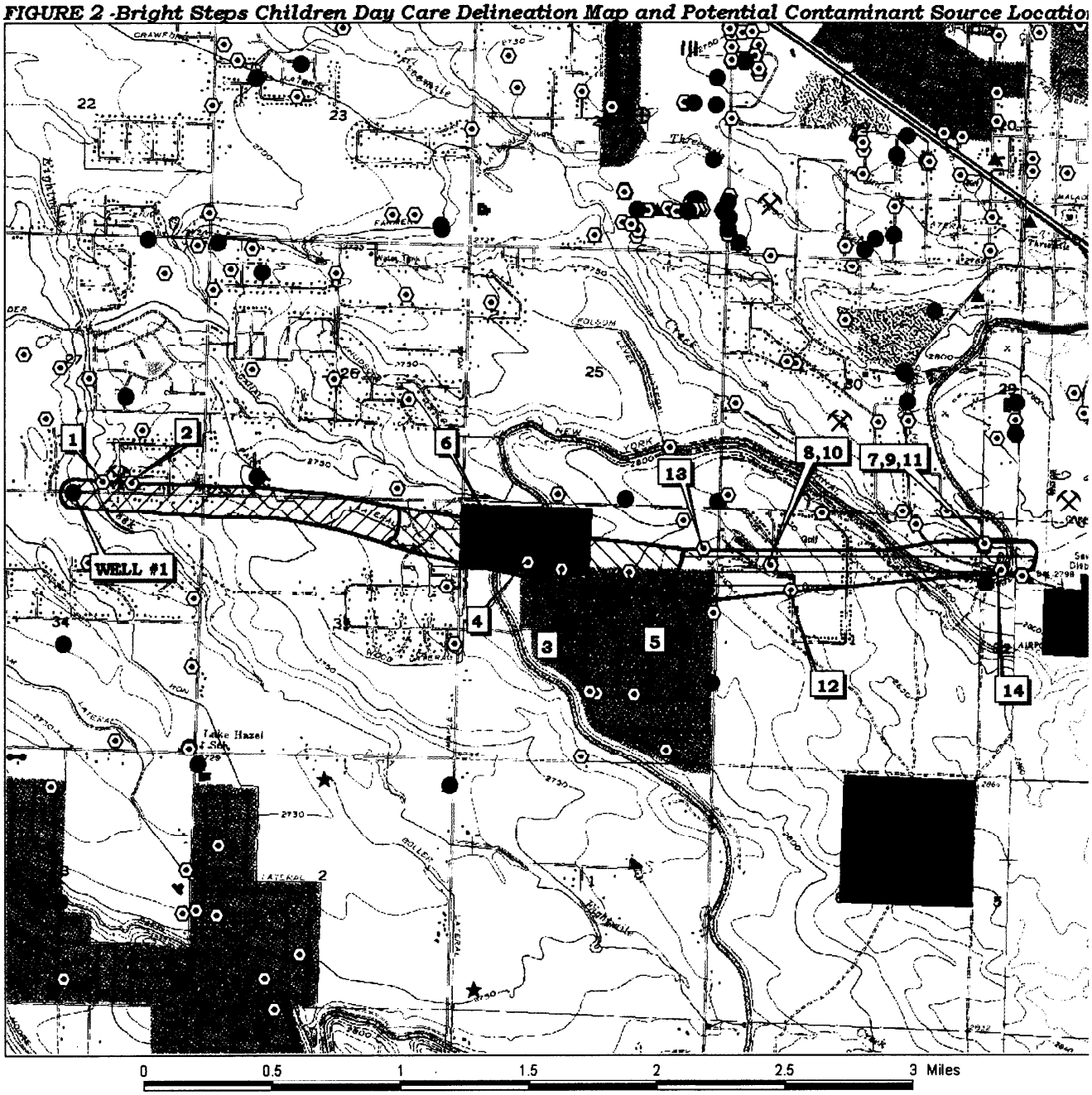


FIGURE 2 -Bright Steps Children Day Care Delineation Map and Potential Contaminant Source Locatio



LEGEND

Time of Travel Zones

- 1B (3 yr TOT)
- 2 (6 yr TOT)
- 3 (10 yr TOT)
- Wellhead
- Enhanced Inventory
- Toxic Release Inventory
- CERCLIS Site
- RICRIS Site
- Business Mailing List
- Dairy
- LUST Site
- NPDES Site
- Mine
- AST

UST Site

- Closed
- Open
- Recharge Point
- SARA Title III Site (EPCRA)
- Injection Well
- Group1 Site
- Cyanide Site
- Landfill
- Wastewater Land App.Site

N

PWS# 4010180
WELL# 1

Table 1. Bright Steps Children Day Care Potential Contaminant Inventory

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	Amity Road	0-3	GIS Map	IOC, VOC, SOC, Microbes
	Horse Pasture	0-3	GWUDI field survey	IOC, Microbes
	Eight Mile Creek	0-3	GWUDI field survey	IOC, VOC, SOC, Microbes
1	Painters	0-3	Business Mailing List	IOC, VOC, SOC
2	Remodeling/Repairing Building Contractor	0-3	Business Mailing List	IOC, VOC, SOC
3	Painters	3-6	Business Mailing List	IOC, VOC, SOC
4	Log Cabin Manufacturers	3-6	Business Mailing List	IOC, VOC, SOC
5	Landscape Contractor	3-6	Business Mailing List	IOC, VOC, SOC
6	WLAP Site-Municipal Wastewater Sludge	3-6	Database Search	IOC
7,9	UST/Excavating Contractor	6-10	Database Search	IOC, VOC, SOC
8	Limousine Service	6-10	Business Mailing List	VOC, SOC
10	Aerial Photographer	6-10	Business Mailing List	IOC, VOC
11	Air & Gas Compressor Manufacturer	6-10	Business Mailing List	IOC, VOC
12	Landscaping Equipment Supplier	6-10	Business Mailing List	IOC, VOC, SOC
13	Metal Engraver	6-10	Business Mailing List	IOC, VOC
14	Conveyors & Conveying Equipment	6-10	Business Mailing List	IOC, VOC, SOC

[1] Find Source Description definitions on page 15
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

NOTE: The site number in this table corresponds to Figure 2, page 20.

Attachment B

Bright Steps Children Day Care Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report

Public Water System Name : BRIGHT STEPS CHILDREN DAY CARE
Public Water System Number 4010180

Well# : WELL #1
1/3/02 9:00:48 AM

1. System Construction		SCORE			
Drill Date	UNKNOWN				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	1997			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	5	4	4	3
(Score = # Sources X 2) 8 Points Maximum		8	8	8	6
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		13	13	15	10
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		20	20	22	12
4. Final Susceptibility Source Score		14	14	14	14
5. Final Well Ranking		High	High	High	High