7 Contingency Plan

7.1 Introduction

The Safe Drinking Water Act (SDWA) and its 1986 amendments require public water purveyors to develop contingency plans to manage and maintain an adequate water supply. In addition, Washington State Department of Health (DOH) requires contingency planning for wellhead protection programs to be incorporated into the purveyor's comprehensive water plan (WAC 246-290-100 and WAC 246-290-210).

A contingency plan for wellhead protection describes multiple actions to be implemented if either of the following conditions occurs:

- Groundwater monitoring detects a significant reduction in water quality either in a monitoring well or in a production well/well field.
- An emergency event, which poses a threat to shut down one or more production wells.

Although other conditions for contingency planning exist (e.g., loss of a transmission main, pumping station difficulties, etc.), only those that relate to potential contamination threats are discussed in this report.

The DOH's *Wellhead Protection Program Guidance Document* further lists several issues that contingency planning must address. As they apply to SAJB members, these are:

- Identify the maximum water system capacity including transmission and storage capacity and the impact from loss of the supply from the largest well.
- Evaluate expansion options for the system.
- Identify potential interties to other public systems and costs to buy and deliver supplies from these systems.
- Evaluate current emergency procedures and make recommendations for contingency planning.
- Identify future potential water sources and methods necessary for the protection of new sources.
- Maintain a list of emergency phone numbers relevant to wellhead protection.

7.2 Contamination Detection

Events that trigger implementation of the contingency plan are detection of a contaminant threat or an emergency event that could lead to a contaminant threat. Actual detection could occur in a monitoring well or a production well. Detection of a contaminant in a monitoring well, but yet to be discovered in a production well, indicates that the purveyor probably has

time to respond in a non-crisis mode. If contaminants are detected in a production well, the purveyor must respond in a more timely manner, depending on the concentration of the contaminant, and how close it is to the regulatory maximum contaminant level (MCL).

Preventive action limits (PALs) have been established to identify a threshold concentration at which additional action *should be considered*. PALs should not be used to prescribe or limit the action of the purveyor to protect the water supply. The PAL shall only be used to heighten the awareness, and possibly take action, to determine the cause and location of the contaminant.

These PALs are lower than the regulatory MCLs to provide the purveyor some time to consider response alternatives. Chemical constituents of an aesthetic nature are not subject to regulatory MCLs and need not be considered in this contingency plan.

PALs for volatile organic compounds (VOCs), synthetic organic compounds (SOCs), and for inorganic constituents were established using different criteria. Because SOCs and VOCs do not occur naturally in groundwater, their presence suggests manmade contamination. Inorganic constituents occur naturally at levels that fluctuate over time and distance. PALs for each category are defined as:

- SOCs/VOCs: 25 percent of the MCL (Table 7-1 and 7-2)
- Inorganics: 50 percent of the MCL (Table 7-3)

7.2.1 Monitoring Wells/Contaminant Detection

Any well with a reported value above the PAL should be sampled again as soon as possible after receiving the results of the laboratory report. This is necessary to detect false positive results attributable to errors in collection, testing or handling of the sample. Strict field protocol should be followed to minimize the possibility of a false positive result. If re-sampling does not produce a value above the PAL, the contingency plan need not be implemented, but the detection event should be noted for future reference.

If the PAL is exceeded, the SAJB should make a preliminary assessment of potential contaminant sources and the potential impact to the production well. The following issues should be determined:

- What are the potential impacts to the overall water systems?
- Which production wells could be removed from service?
- Can potential sources of the contaminant be identified?
- Could the monitoring well be on the edge of a contaminant plume, with higher concentrations impacting another well?
- What is the closest distance the contaminant could be from a production well?
- What time has elapsed since the previous sampling date and what is the travel rate for the contaminant?

Figure 7-1 is a flow chart showing actions that should be considered if potential contamination is detected in a monitoring well.

Table 7-1: Volatile Organic Constituents

Maximum Contaminant Levels (MCL)/Preventive Action Limits (PAL)			
CAS No.	**Contaminant**	**MCL (mg/L)**	**PAL (mg/L)**
75-01-4	Vinyl chloride	0.002	Detection
71-43-2	Benzene	0.005	0.00125
56-23-5	Carbon tetrachloride	0.005	0.00125
107-06-02	1,2-Dichloroethane	0.005	0.00125
79-01-06	Trichloroethylene	0.005	0.00125
106-46-7	para-Dichlorobenzene	0.075	0.0188
75-35-4	1,1-Dichloroethylene	0.007	0.00175
71-55-6	1,1,1-Trichloroethane	0.2	0.05
156-59-2	cis-1,2-Dichloroethylene	0.07	0.00175
78-87-5	1,2-Dichloropropane	0.005	0.00125
100-41-4	Ethylbenzene	0.7	0.175
108-90-7	Monochlorobenzene	0.1	0.025
95-50-1	o-Dichlorobenzene	0.6	0.150
100-42-5	Styrene	0.1	0.025
127-18-4	Tetrachloroethylene	0.005	0.00125
108-88-3	Toluene	1	0.25
156-60-5	trans-1,2-Dichloroethylene	0.1	0.025
1330-20-7	Xylenes (total)	10	2.500
75-09-2	Dichloromethane	0.005	0.00125
120-82-1	1,2,4-Trichloro-benzene	.07	0.0175
79-00-5	1,1,2-Trichloro-ethane	0.005	0.00125

Notes:
Source: 40 CFR 141.61
2. PALs are 25 percent of the MCL or at the method detection limit, whichever is higher
Analytical Method: EPA 524.2

Table 7-2: Synthetic Organic Constituents (Phase II/V)

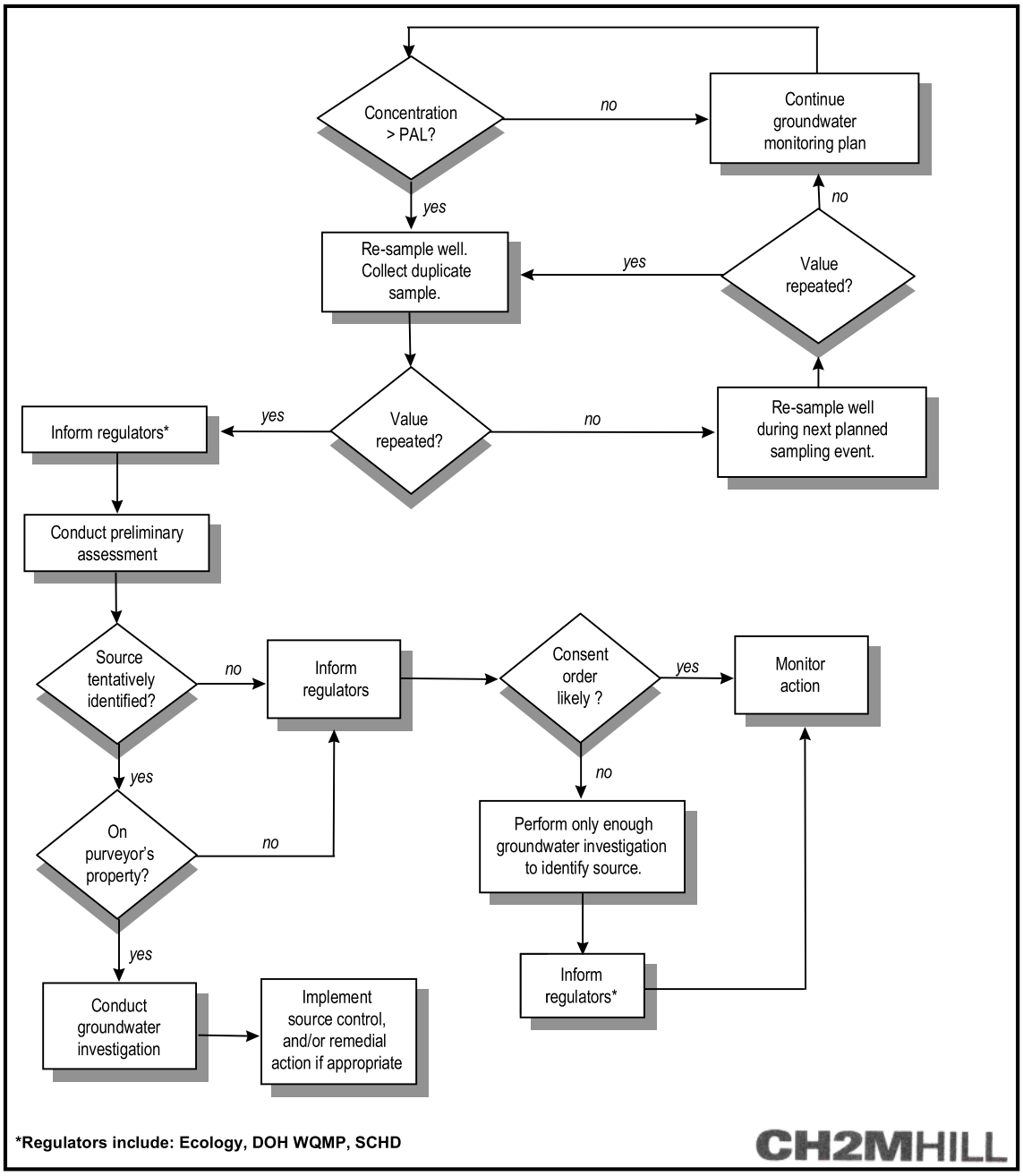
Maximum Contaminant Levels (MCL)/Preventive Action Limits (PAL)		
Contaminant	**MCL (mg/L)**	**PAL (mg/L)**
Alachlor	0.002	0.0005
Aldicarb	0.003	0.00075
Aldicarb sulfoxide	0.004	0.001
Aldicarb sulfone	0.002	0.0005
Atrazine	0.003	0.00075
Carbofuran	0.04	0.01
Chlordane	0.002	0.0005
Dibromochloropropane	0.0002	0.00005
2,4-D	0.07	0.0175
Ethylene dibromide	.00005	1.25x10-5
Heptachlor	0.0004	0.0001
Heptachlor epoxide	0.0002	0.00005
Lindane	0.0002	0.00005
Methoxychlor	0.04	0.01
Polychlorinated biphenyls	0.0005	0.000125
Pentachlorophenol	0.001	0.00025
Toxaphene	0.003	0.00075
2,4,5-TP	0.05	0.0125
Benzo[a]pyrene	0.0002	0.00005
Dalapon	0.2	0.055
Di(2-ethylhexyl) adipate	0.4	0.1
Di(2-ethylhexyl) phthalate	0.006	0.0015
Dinoseb	0.007	0.00175
Diquat	0.02	0.005
Endothall	0.1	0.025
Endrin	0.002	0.0005
Glyphosate	0.7	0.175
Hexacholorbenzene	0.001	0.00025
Hexachlorocyclopentadiene	0.05	0.0125
Oxamyl (Vydate)	0.2	0.05
Picloram	0.5	0.125
Simazine	0.004	0.001
2,3,7,8-TCDD (Dioxin)	3x10-8	7.5 x10-7

Table 7-3: Inorganic Constituents

Maximum Contaminant Levels (MCL)/Preventive Action Limits (PAL)		
Contaminant	**MCL (mg/L)**	**PAL (mg/L)**
Primary Constituents		
Antimony	0.006	0.003
Arsenic	0.050	0.025
Barium	2.01	1.0
Berylium	0.004	0.002
Cadmium	0.005	0.0025
Chromium	0.100	0.05
Copper	1.3	.05
Iron	0.30 S	0.15
Lead	0.015 AL	(refer to note 3)
Manganese	0.050 S	0.025
Mercury	0.002	0.001
Nickel	0.10	.05
Nitrate	10	5
Nitrite	1.0	0.5
Selenium	0.05	0.025
Silver	0.050	0.025
Thallium	0.002	0.001
Secondary (Aesthetic) Constituents		
Asbestos (>10um)	7 million fibers/liter	3.5 MFL
Chloride	250.0	125.0
Color	15 color units	7.5
Copper	1.0	0.5
Fluoride	2.0	1.0
Foaming Agents	0.5	0.25
Iron	0.30	0.15
Manganese	0.05	0.025
Odor	3.0	1.5
pH	6.5 - 8.5	
Silver	0.1	0.05
Sulfate	250	125
TDS	500	250
Zinc	5 S	2.5

Notes:
1. Table includes general chemistry constituents and metals.
2. The PAL for IOC's was set at one-half the MCL
3. "AL" indicates that while no MCL has been established, 0.015 mg/L is a recommended action level for lead (National Primary Drinking Water Standards, U.S. EPA Region 5, updated June 1993). A water supplier is required to take action if greater than 10% of the connections exceed 0.015 mg/L (U.S. EPA drinking water hot-line.)

Figure 7-1: Approach to Groundwater Contingency Plan for a Monitoring Well Showing Contamination



A preliminary assessment must be made to identify the potential source of contamination. The preliminary assessment will determine if additional investigation is necessary. If the assessment determines the source is on purveyor property, the purveyor should report the findings to the following agencies:

- Washington State Department of Health (DOH)
- Washington State Department of Ecology (Ecology)
- Spokane County Water Quality Management Program (WQMP)

- Spokane County Health District (SCHD)

Under this condition the purveyor should also be contemplating remedial measures.

If the potential source is not on the purveyor's property, the purveyor may choose to install a monitoring well immediately down-gradient of the suspected source. Information from this monitoring well could be used by Ecology to exercise its regulatory authority for remediation of the source site. The purveyor should monitor the progress of the investigation and remediation, and should, when necessary, retain a technical consultant to protect the purveyor's interests in the matter.

If the potential source of contamination is not identified, the purveyor should consult with Ecology and other agencies to determine a future course of action.

7.2.2 Production Well Contaminant Detection

Any well with a reported value above the PAL should be re-sampled as soon as possible after the laboratory report. This is necessary to detect false positive results attributable to errors in collection, testing or handling of the sample. Strict field protocol should be followed to minimize the possibility of a false positive result. If re-sampling does not produce a value above the PAL, the contingency plan need not be implemented, but the detection event should be noted for future reference.

If the PAL is exceeded, the SAJB should notify regulators and make a preliminary assessment of the source and potential impact to the production well. The following issues should be determined:

- Is the MCL exceeded? (If so, follow requirements of WAC 46-290-320)
- If the MCL is not violated, should the well remain in service with sampling performed more frequently?
- If the MCL is being exceeded, immediate interim measures can and should be taken, including 1) pumping the well to waste, 2) removing the source from production, or 3) providing emergency treatment at the wellhead.

If a source of contamination is not identified and the concentration is below the MCL, the SAJB may continue to use the well while:

- Conducting a source investigation with regulators.
- Considering alternatives for the production well, planning for groundwater treatment.

If the source has been identified, control and remedial action should be pursued in the same manner as described in Chapter/Section 7.2.2 Monitoring Wells/Contaminant Detection, but with more expediency.

Operation of a particular well may influence groundwater migration. If contaminants are migrating toward a well, but have only been detected in monitoring wells, the production well could be shut down, reducing the obvious threat to the public health. However, shutting down a well could change the groundwater flow pattern that could affect contaminant travel to other wells. Other less apparent alternatives must be considered,

including continued pumping and treatment or pumping the water to waste. ***Each case must be evaluated individually.***

Figure 7-2 is a flow chart showing actions to be taken if contamination is detected in a production well.

7.3 Individual Purveyor Contingency Plans

SAJB members worked together to plan for possible future emergencies. Each district has examined its systems and investigated alternatives. Some districts, such as Modern Electric and Consolidated are continuing to install interties with their neighbors, as well as, improve their own systems. Individual districts without excess capacity have reviewed their short-falls, and all districts have identified were piping system improvements are needed to move water more efficiently from one water source to emergency areas. Individual water purveyors have completed a contingency plan for their district. These contingency plans are in Appendix Q.

7.4 Master Contingency Plan

The following is a master plan that encompasses all SAJB's member plans.

- Contingency Plan Resources. The system characteristics listed below will be used by some districts to overcome the loss of a well or well-field.

Excess capacity. Several districts have excess capacity within their own systems and can successfully manipulate the distribution system to adjust to loss of a single well.

Neighboring District Interties. Several districts have interties with neighboring districts that can be used to supply water to the impacted system. These interties range from undersized lines that supply minimum quantities for minimal public health needs to permanent interties that have been used to purchase water.

Reservoir Storage. Most districts have reservoirs, which reduce demands on alternate sources of water. Some districts will use their reservoir storage to provide fire flows.

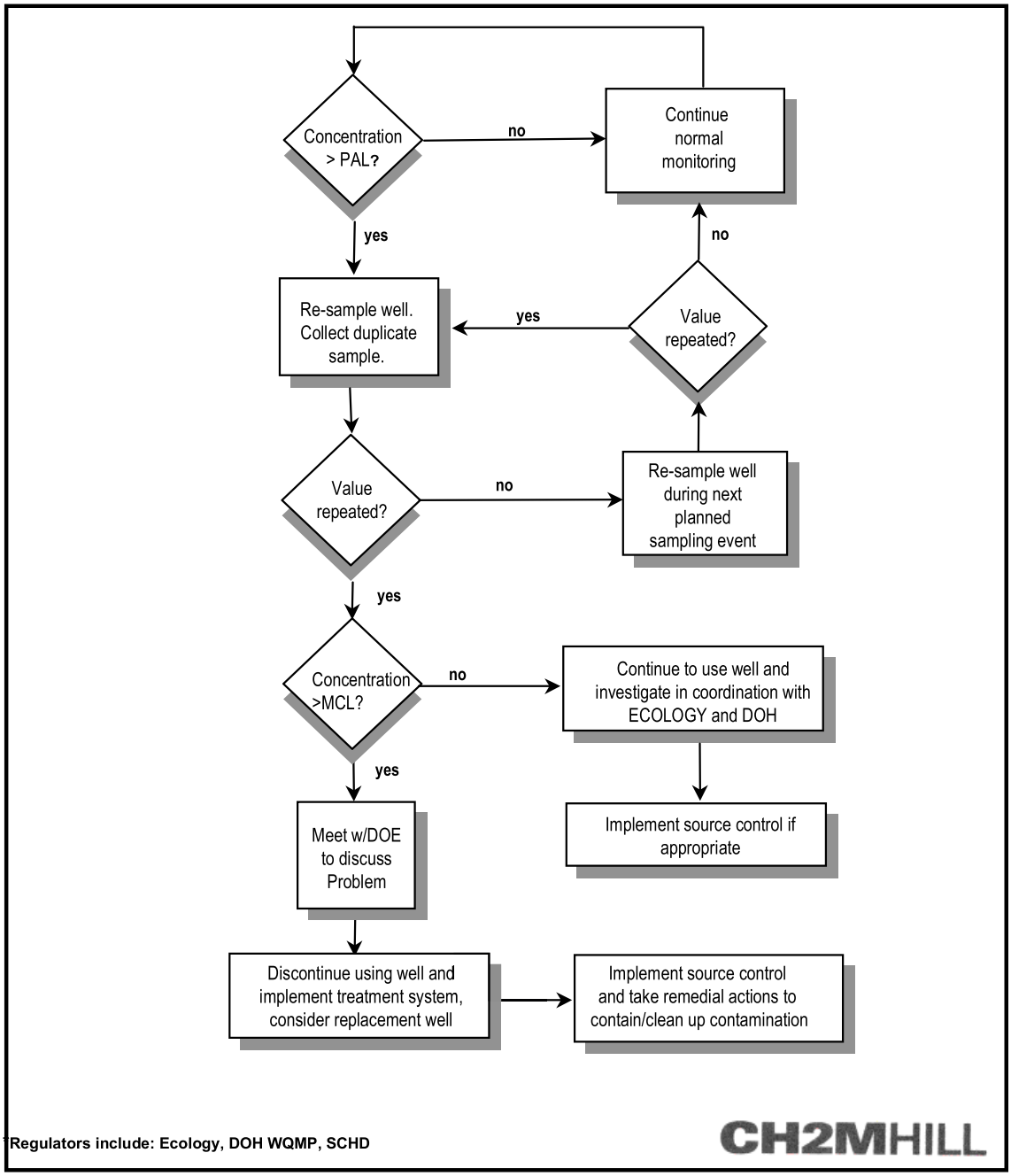
- Immediate Shortcomings. The system characteristics listed below present problems and limit a district's ability to respond to loss of a well.

No Excess Capacity. Some districts have no excess capacity and would have to rely on purchase from neighboring districts.

Interties - Some districts do not have interties or have a seriously undersized pipe that severely restricts their ability to respond.

New Well Sites. Several smaller districts are on the fringe of the aquifer and have no or limited well sites on which to drill a new well.

Figure 7-2: Approach to Groundwater Contingency Plan for a Production Well Showing Contamination



7.4.1 Emergency Responses

Examples of emergencies relevant to wellhead protection areas include:

- Tanker-truck or rail-car spill releasing hazardous material
- Fire at a hazardous material storage site

- Rupture of tanks storing hazardous materials
- Major failure of a large sanitary interceptor sewer
- Rupture of an underground petroleum pipeline

Emergencies can take many forms which makes rigid and detailed planning difficult, and undesirable. Therefore, an effective contingency plan must be flexible enough to be implemented under a variety of circumstances. Intelligent onsite decisions can only be made when the particular circumstances of an emergency are fully understood. Flexibility, therefore, lies in summoning all appropriate officials to the site so that a complete and balanced response decision can be made. Wellhead protection concerns must be addressed at each emergency event. Failure to do so can lead to the loss of a well. For example, in the past, the typical reaction to a fire at a chemical warehouse has been to combat the fire to preserve the structure and property at risk. However, in a high risk area (extremely transmissive soil) that response may lead to large quantities of contaminated water or liquid flowing into the soil and groundwater. Depending on the particular site conditions, the appropriate response to this emergency may be to allow the structure and stored product to burn. This will minimize the flow of water or liquids that could contaminate groundwater.

Several factors control the urgency of a response, including type of material spilled, quantity, location of the nearest production well, and the nature of the surfacing and underlying soils at the spill location.

The SAJB response to a threat to the aquifer must be consistent and coordinated with the emergency response teams that includes the HAZMAT Team, the state and local Department of Emergency Management (DEM) and the other agencies. The SAJB's goal is for the individual affected water purveyor to participate fully with the entire emergency response team by providing critical information such as wellhead location, pump status, pumping rates, and wellhead capture zones. A planned single dispatch center will assist the SAJB in this effort as it provides a coordinated County-wide response for all emergencies. Figure 7-3 is a simplified communications flow chart showing the relationships that are important to the affected SAJB water purveyor.

The Department of Ecology (Ecology) oversees the environmental control and subsequent clean-up of a spill. Three divisions of Ecology could be involved. The Spill Response Team responds to emergencies with the HAZMAT Team and will typically be the point of emergency contact for SAJB water districts. They can often provide identification of spilled liquids and characterization of the health threat. The Water Quality Division deals with business practices and permits. The Toxic Clean-up Division oversees long-term remediation. Reports may also come in through Ecology's Hazardous Waste and Toxic Reduction Program or the code enforcement monitoring by the City's Solid Waste Management Department. In any case, the SAJB expects to be notified of any spills or suspected activities reported to Ecology, including reports for which Ecology takes no immediate action.

7.4.2 Purveyor Operational Response

Once notified of an emergency, the SAJB and water purveyor's course of action is outlined in the flowchart presented in Figure 7-3.

Figure 7-3: Approach to Emergency Response within WHP Area

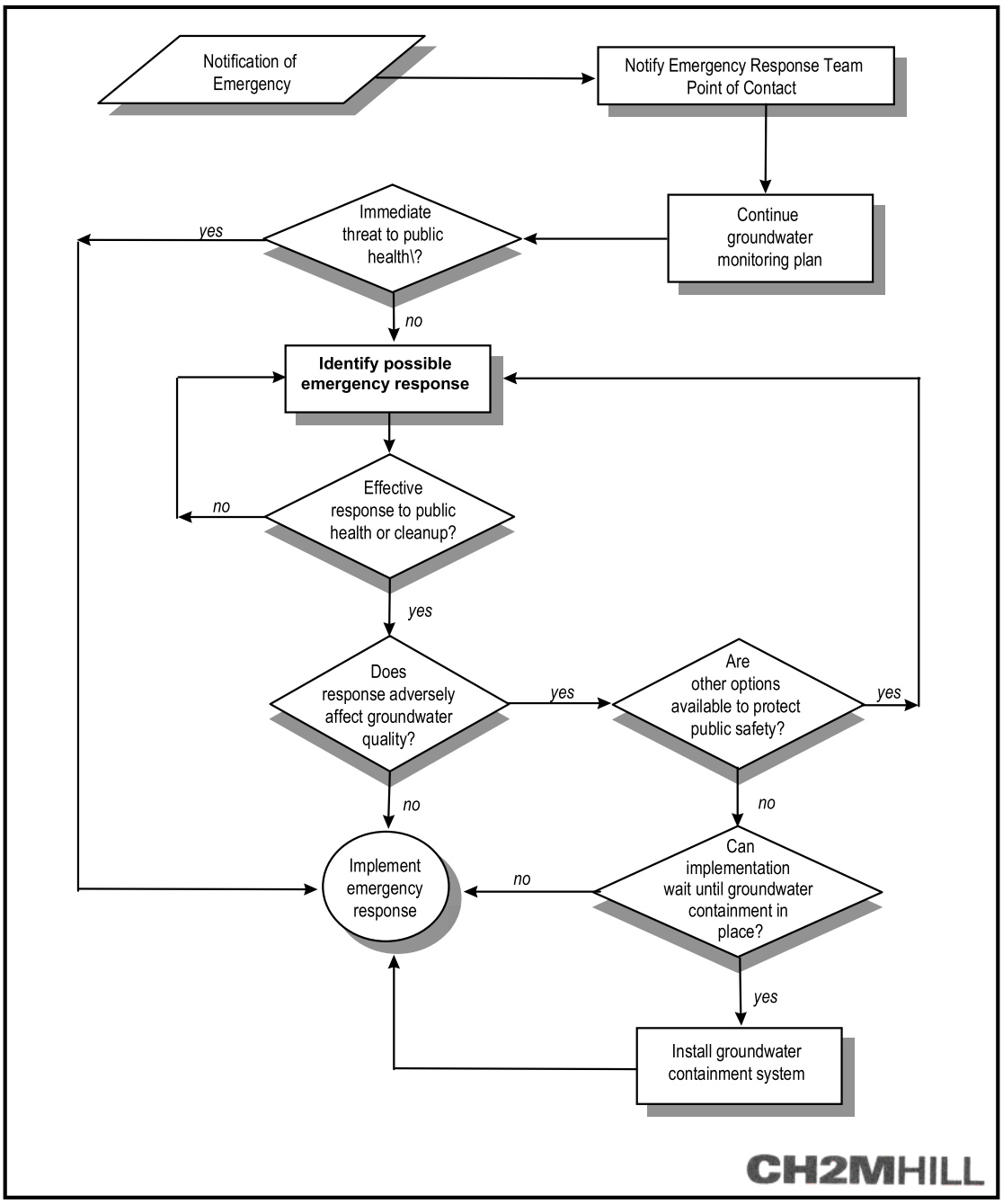


Figure 7-4: Emergency Response Communications Flowchart

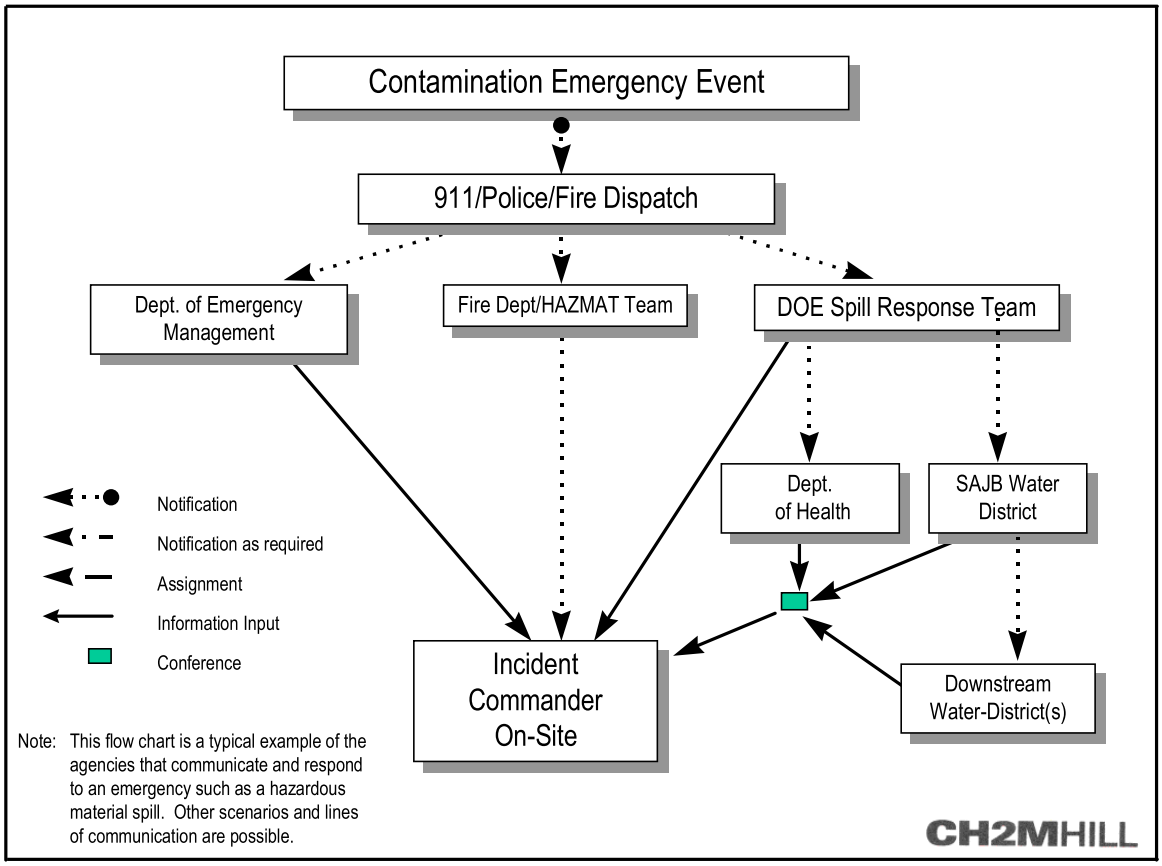


Table 7-4 provides a list of emergency agency contacts, all SAJB members, and their phone numbers.

7.5 Plan Updates

Purveyors must maintain communications with Ecology's Spill Response team, the HAZMAT Team and the City and County fire dispatch centers. Additionally, they must maintain an updated contact list for these organizations as well as neighboring water districts, the Department of Health and Department of Emergency Management.

Each water purveyor should identify significant developments within their system or neighboring systems that will affect their contingency plan on an annual basis. The review would include changes in well/pump production, permanent changes to the distribution system, and changes in the neighboring systems' ability to supply water in an emergency situation.

Individual purveyor contingency plans should be updated and approved by the water purveyor's elected officals every five years.

- The SAJB should develop a common intertie agreement, and/or prepare a list of items to be addressed in the agreements so that each utility could review their existing agreements and modify them as necessary.

- Sample SAJB resolutions should be developed that authorize and identify various conservation measures, as well as, sample customer notices.

Table 7-4: Emergency Response Phone List

Agency	Contact	Phone #
Ecology Spill Response	Jim Chulose	(509) 625-5180
Fire Dept./HAZMAT	Skip Powell	(509) 625-7091
Dept. Emergency Management	David Burnes	(509) 456-2204
Department of Health	Tom Wells	(509) 456-3115
SAJB Water Districts		
Carnhope Irrigation District #7	Terry Squibb	(509) 536-9180
Consolidated Irrigation Dist. #19	Bob Ashcraft	(509) 924-3655
East Spokane Water District #1	Gary McGeorge	(509) 926-6072
Hutchinson Irrigation District #16	Walt McKee	(509) 926-4634
Irvin Water District #6	Glenn Talmage	(509) 924-9320
Kaiser Aluminum - Mead	Mike Sawatzky	(509) 466-3300
Kaiser Aluminum Trentwood	Pat Blau	(509) 924-1500
Liberty Lake Sewer District #1	Lee Mellish	(509) 922-5443
City of Millwood	Cleve McCoul	(509) 924-0960
Moab Irrigation District #20	George Stegemann	(509) 226-0545
Model Irrigation District #18	Jim Lahde	(509) 926-5759
Modern Electric Water Company	Dave Johnson	(509) 928-4540
North Spokane Irrigation Dist #8	Gary Lowe	(509) 467-6727
Orchard Avenue Irrigation Dist.	Mike Kline	(509) 926-4563
Pasadena Park Irrigation Dist. #17	Kathy Small	(509) 926-5535
Spokane Industrial Park	Rob Gragg	(509) 924-1720
Spokane County Water District #3	Ty Wick	(509) 536-0121
Trentwood Irrigation District #3	Mike Miller	(509)922-7532
Vera Water and Power	Steve Skipworth	(509) 924-3800
Whitworth Water District #2	Susan McGeorge	(509) 466-7511
The City of Spokane	Upriver Station (24 hr radio dispatch)	(509) 625-6640 or 6641