



## JOB DEMANDS ANALYSIS

**Company:** Greater Vancouver Regional District    **Location:** Lion's Gate

**Job Title:** Sewer Plant Operator    **Classification:** Regular Duty

### Purpose of Activities

The purpose of the duties of the Sewer Plant Operator is to make certain that the sewage treatment plant runs effectively and safely.

### Tools and Equipment

The labourer will use the following tools and equipment to perform their duties:

- Gloves.
- Safety Hat
- Safety Boots.
- Safety Vest.
- Shovels, rakes, broom and other hand tools.
- Wheelbarrow.

### Usual Methods

Much of the operator's day is spent moving around the site and making adjustments to controls and valves. Other elements of the job include monitoring plant functions and assisting other people with maintenance projects. They also carry out some light labour duties like cleaning, handling sample rods, hoses, lifting grates for cleaning, turning valves with a key or by hand.

There is also regular SCBA training and confined space rescue simulations. It is also possible that a real rescue may have to be performed. The position involves a lot of walking, sitting, standing and light stair-climbing.

### Administrative Issues

The operator works throughout the plant on an eight-hour day shift. There are four operators at Lion's Gate (many more at other plants where there are secondary



processes) and one foreman. They rotate days to cover the seven days each week and rotate call duties to cover nights.

The work requires moving between outdoor and indoor environments. Some of the indoor work involves exposure to raw or slightly processed sewage. There are certain areas where spaces are very confined and noise levels are high enough that hearing protection is required.

#### Activity Demand Variables

These variables are tasks that must be carried out by the employee and are implicitly or explicitly required as objectives of the job.

- Work in some confined spaces.
- Walk over concrete and stairs.
- Climb up and down ladders.
- Carry out some tasks under unpredictable outdoor conditions that often include steady rainfall.
- Exposure to sewage.

#### Worker Decision Variables

These variables are the sub-routines and cognitive/physical decisions made by the worker in carrying out the objectives of the job.

- Choose postures for carrying out duties (e.g. lifting using hips and maintaining neutral spine, creative energy saving techniques).
- Planning of lifts and routes for carrying (limited).

#### Accommodative Considerations

1. Individuals with knee, hip or ankle difficulties may find they have difficulty with this job because of constant walking.
2. Individuals recovering from systemic illness should be carefully screened before entering this activity.
3. Individuals who do not cope well in outdoor work environments would have difficulty with this position.
4. There is a learning curve associated with the tasks.

Prepared By: Greg Hart, Kinesiologist

March, 1999



## **Summary of Stresses**

### **Metabolic Stresses**

The aerobic energy system supplies the vast majority of energy required to complete the tasks in this position since the work is ongoing in nature. There is also a high anaerobic power requirement associated with occasional heavy lifts.

### **Structural Stresses**

There is regular walking associated with this position, but there is enough variation in the work that there is little in the way of accumulated structural stresses. There is occasional lifting, pushing and pulling that has implications for the spine and for the shoulders and upper extremities.

As long as significant sitting is avoided, there is minimal associated structural stress to the operator.

### **INTERVENTIONS**

Recommendations that could be implemented to increase productivity and lessen the risk of injury are listed below:

1. Encourage the workers to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, anaerobic power, muscular strength, muscular endurance and flexibility. Especially cardiovascular endurance.
2. Provide regular education in effective use of the body and neutral joint positions for this type of work.
3. Insure that sitting is never carried out for long durations (longer than 30 minutes at a time).
4. Avoid asymmetrical lifts wherever possible.
5. Avoid twisting with a load to avoid damage to discs in the spine.
6. Plan the route when manually handling materials.
7. Take a moment to extend the spine and warm up the body when switching from sitting to strenuous activities.



8. Review footwear to insure that safety wear also is as light as possible with excellent heel and forefoot support.

PJDC-Sewer Plant Operator

Referral: Keith Arkell		Organization: GVRD						Title: Plant Operator - Sewers		
Dept.: Engineering		Division: Sewers						Contact: Iain Sellars		
		Date: March, 1999								
PHYSICAL DEMANDS		REQD	SIDE	FREQUENCY*				Max. Weight (kg)	Usual Weight (kg)	COMMENTS
				Sel 1	Low 2	Mod 3	High 4			
S T R E N G T H	Lifting - Floor to Knuckle		B		X			40	10	Sump pumps, grates, sample rods, rag buckets
	Lifting - Knuckle to Waist		B		X			40	10	Sump pumps, grates, sample rods, rag buckets
	Lifting - Waist to Shoulder									
	Lifting - Over Head									
	Carrying - With Handles		B		X			20	10	Wheelbarrow for less than 50 metres
	Carrying - Without Handles		B		X			10	5	Shovel, vacuum hoses, water hoses
	Pushing - Upper Extremity									
	Pushing - Hip/Leg Assist		B	X				10	5	Shovel, vacuum hoses, water hoses, rescue
	Pulling - Upper Extremity		B		X			40	10	Valves, pumps, buckets, hoses
	Pulling - Hip/Leg Assist		B	X				30	30	Lift grate out of floor to wash
	Reach - Shoulder or Above									
	Reach - Sho. or Above extnd									
	Reach - Below Shoulder		D			X		min	min	To access items for maintenance
	Reach - Bel. Shoulder extnd									
	E N E R G Y	Handling		B			X		40	10
Gripping			B			X		max	mod	Shovel, vacuum and water hoses, rods, etc.
Fine Finger Movements			B			X		mod.	min.	Switches, computer keys, nuts and bolts
P O S T U R E S	Aerobic (percent)						95	Most activities are walking, sitting and short stair climbing		
	Anaerobic (percent)			5				For occasional exertion in lifting or climbing a long flight of stairs		
	High Energy Expenditure			X				Confined space rescue or simulation		
	Low Energy Expenditure						X	For almost all activities including sitting and light walking		
M O B I L I T Y	Neck - Static Flexion				X			Working on low level issues, checking water		
	Neck - Static Neutral									
	Neck - Static Extension									
	Neck - Rotation									
	Throwing									
	Sitting					X		Monitoring plant functions		
	Standing					X		To carry out many duties and as an alternative to sitting		
	Walking						X	Around the plant on concrete and metal, <200 metres/time		
	Running/Jumping			X				Possible in emergency situation		
	Climbing - Arms and Legs				X			Ladders in the plant (< 10 metres/time)		
	Climbing - Legs Only				X			Stairs in the plant, less than two flights/time usually		
	Bending/Stooping				X			Carry out low level equipment checks		
	Crouching				X			Carry out low level equipment checks		
	Kneeling			X				Carry out low level equipment checks		
	G E N E R A L	Crawling								
Twisting										
Balancing						X		On ladders, over railings, near access shafts		
Traveling										
Work Alone					X			Possible for some elements of the day		
N O T E	Interact with Public									
	Operate Equip/Machinery					X		Valves, pumps, computer, control panels		
Irregular/Extended Hours				X				On call every now and again on night shift		

\* Frequency Legend      1 = Seldom; Not Daily    2 = Low Daily Activity; < 1hr  
3 = Moderate Demand; Repetition 1 - 3 hrs daily      4 = High Frequency Demand; Repetition > 3 hrs daily

The following shading denotes a      HIGH RISK TASK:      Modifications should be considered

**REQD** is marked with an X if the particular demand or category is relevant to the purpose of the job.

**SIDE** refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

PJDC-Sewer Plant Operator

Referral:		Organization:				Title: see 1st page header			
Dept.:		Division:				Contact:			
PHYSICAL DEMANDS		R E Q D	S I D E	FREQUENCY*				COMMENTS	
				Sel. 1	Low 2	Mod. 3	High 4		
PERSONAL	Hearing - Conversations		B			X		Colleagues in person, via phone, via radio	
	Hearing - Other Sounds		B				X	Alarms, machinery noises	
	Vision - Far						X	Most activity	
	Vision - Near				X			Examine parts or guages closely	
	Vision - Colour								
	Vision - Depth				X			Distances have to be judged when raising and lowering things	
	Perception - Spatial					X		Many tasks involve working around obstacles	
	Perception - Form								
	Feeling (Tactile)								
	Reading				X			Computer screens, gauges, instructions, correspondence	
WORK	Writing		D		X				
	Speech						X	Talking with colleagues	
	Inside Work						X	In buildings and tunnels	
	Outside Work						X	On grounds	
	Hot Conditions >25 deg. C			X				Occasionally, during summer months	
	Cold Conditions <10 deg.C			X				Can be exposed (outside) briefly during the winter time	
	Humid					X		In some enclosed spaces with water, outdoors on some days	
	Dust								
	Vapor Fumes					X		Sewage fumes	
	OTHER	Hazardous Machines							
Proximity to Moving Object									
Noise			B			X		Some enclosed areas in the plant - very loud (>110 db) equipment	
Electrical Hazard									
Sharp Tools									
Radiant/Thermal Energy						X		From engines and pumps in the buildings	
Slippery Conditions							X	Around water constantly	
Vibration and Related									
Chemical Irritants						X		Chlorine and cleaning substances	
Organic Substances							X	Raw and partly processed sewage water	
MEDICAL	Medical Waste								
	Blood Products								
	Congested Worksite				X			Some very confined spaces that may require SCBA wearing	
	Lighting - Direct					X		Daylight	
	Lighting - Indirect								
	Lighting - Adjustable								
	Lighting - Fluorescent				X			Some interior areas	
	Lighting - Incandescent					X		Most interior spaces	
	Lighting - Shadows etc.				X			In some parts of the plant	

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For detailed descriptions of each of the different categories, please refer to the reference guide or inquire with Human Effort at 1-888-4EFFORT